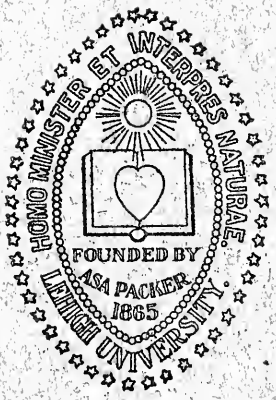
REGISTER

OF

LEHIGH UNIVERSITY



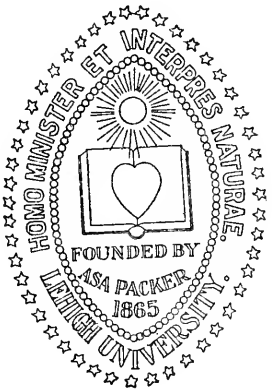
1907-1908

SOUTH BETHLEHEM, PENNA.

REGISTER

OF

LEHIGH UNIVERSITY



1907-1908

SOUTH BETHLEHEM, PENNA.

1907.

JULY.

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

AUGUST.

S	M	T	W	T	F	S
..	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

SEPTEMBER.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	...	...	...	...	...
...	...	...	...	...	...	...

OCTOBER.

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

NOVEMBER.

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
...	...	...	...	...	...	...

DECEMBER.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...
...	...	...	...	...	...	...

1908.

JANUARY.

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

FEBRUARY.

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
...	...	...	...	...	...	...

MARCH.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	...	...	...	...
...	...	...	...	...	...	...

APRIL.

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	...	...
...	...	...	...	...	...	...

MAY.

S	M	T	W	T	F	S
...	...	.	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

JUNE.

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	...	...	...	...
...	...	...	...	...	...	...

JULY.

S	M	T	W	T	F	S
...	...	...	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	...
...	...	...	...	...	...	...

AUGUST.

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	...	...	...	...	...

SEPTEMBER.

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	...	...	...
...	...	...	...	...	...	...

OCTOBER.

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
...	...	...	...	...	...	...

NOVEMBER.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	...	...	...	...
...	...	...	...	...	...	...

DECEMBER.

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	...	...
...	...	...	...	...	...	...

1909.

JANUARY.

S	M	T	W	T	F	S
...	...	...	...	...	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	...	...	...	...	...	...

FEBRUARY.

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	...	...	...	...	...	...
...	...	...	...	...	...	...

MARCH.

S	M	T	W	T	F	S
...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	...	...	...
...	...	...	...	...	...	...

APRIL.

S	M	T	W	T	F	S
...	...	...	...	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	...
...	...	...	...	...	...	...

MAY.

S	M	T	W	T	F	S
...	...	...	...	...	...	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	...	...	...	...	...

JUNE.

S	M	T	W	T	F	S
...	...	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	...	...	...
...	...	...	...	...	...	...

CALENDAR.

1907–1908.

1907.

Sept. 13, 14, 16, 17, (Friday, Saturday, Monday, Tuesday), . . .	Examinations for Admission.
Sept. 18, 3.30 P.M., (Wednesday) .	First Term begins.
Oct. 10, (Thursday) . . .	Founder's Day.
Nov. 27, 12.00 M., (Wednesday) .	Thanksgiving Recess begins.
Dec. 2, 8.15 A. M., (Monday) . .	Thanksgiving Recess ends.
Dec. 20, 12.30 P. M., (Friday) .	Christmas Holidays begin.

1908.

Jan. 2, 8.15 A. M., (Thursday) . .	Christmas Holidays end.
Feb. 4, 8.15 A. M., (Tuesday) .	Second Term begins.
Feb. 22, (Saturday) . . .	Washington's Birthday Celebration.
April 15, 12.30 P. M., (Wednesday)	Easter Holidays begin.
April 23, 7.45 A. M., (Thursday) .	Easter Holidays end.
June 7, (Sunday) . . .	Baccalaureate Sunday.
June 8, (Monday) . . .	Class Day.
June 9, (Tuesday) . .	Alumni Day.
June 10, (Wednesday) . . .	University Day.
June 11, (Thursday) . . .	Summer Term begins.
June 10, 11, 12, 13, (Wednesday, Thursday, Friday, Saturday) . . .	Examinations for Admission.

1908–1909.

1908.

Sept. 11, 12, 14, 15, (Friday, Saturday, Monday, Tuesday) . . .	Examinations for Admission.
Sept. 16, 3.30 P.M., (Wednesday) .	First Term begins.
Oct. 8, (Thursday) . . .	Founder's Day.
Nov. 25, 12.00 M., (Wednesday) .	Thanksgiving Recess begins.
Nov. 30, 8.15 A. M., (Monday) . .	Thanksgiving Recess ends.
Dec. 23, 12.30 P. M., (Wednesday).	Christmas Holidays begin.

1909.

Jan. 5, 8.15 A. M., (Tuesday) . .	Christmas Holidays end.
Feb. 2, 8.15 A.M., (Tuesday) .	Second Term begins.
June 9, (Wednesday) . . .	University Day.

BOARD OF TRUSTEES.

William H. Sayre,	South Bethlehem.
Elisha P. Wilbur,	South Bethlehem.
Henry R. Price,	Brooklyn, N. Y.
Rt. Rev. Ethelbert Talbot,	South Bethlehem.
William A. Lathrop,	Wilkes-Barre and Philadelphia.
Rembrandt Peale,	New York, N. Y.
Warren A. Wilbur,	South Bethlehem.
Charles L. Taylor,	Pittsburg.
A. N. Cleaver,	South Bethlehem.
John Fritz,	Bethlehem.

HONORARY TRUSTEE.

Rev. Marcus A. Tolman,	Bethlehem.

HONORARY ALUMNI TRUSTEES.

	TERM EXPIRES	
John A. Jardine, Class of 1884.	1908,	Philadelphia.
Frank P. Howe, Class of 1878.	1909,	Philadelphia.
Thomas M. Eynon, Class of 1881.	1910,	Philadelphia.
Garrett B. Linderman, Class of 1887.	1911,	South Bethlehem.

OFFICERS OF THE BOARD OF TRUSTEES.

President,
WILLIAM A. LATHROP.

Secretary,
ELISHA P. WILBUR.

Treasurer,
R. MORRIS GUMMERE.

Assistant Treasurer,
H. S. KITCHEL.

EXECUTIVE COMMITTEE.

WARREN A. WILBUR, *Chairman,*
ELISHA P. WILBUR, WILLIAM A. LATHROP,
WILLIAM H. SAYRE, RT. REV. ETHELBERT TALBOT,
CHARLES L. TAYLOR, A. N. CLEAVER,
R. MORRIS GUMMERE, *Secretary.*

COMMITTEE ON BUILDINGS AND GROUNDS.

WARREN A. WILBUR, *Chairman,*
A. N. CLEAVER, CHARLES L. TAYLOR.
REMBRANDT PEALE.

COMMITTEE ON COLLEGE ADMINISTRATION.

WILLIAM H. SAYRE, *Chairman,*
RT. REV. ETHELBERT TALBOT, WILLIAM A. LATHROP,
HENRY R. PRICE.

COMMITTEE ON FINANCE AND INVESTMENTS.

CHARLES L. TAYLOR, *Chairman,*
WILLIAM A. LATHROP. WARREN A. WILBUR.

FACULTY.

HENRY S. DRINKER, E.M., LL.D.,
PRESIDENT,
University Park, South Bethlehem.

JOSEPH F. KLEIN, D.E.,
Professor of Mechanical Engineering.
357 Market Street, Bethlehem.

CHARLES L. THORNBURG, C.E., PH.D.,
Professor of Mathematics and Astronomy.
University Park, South Bethlehem.

WILLIAM C. THAYER, M.A., L.H.D.,
Professor of the English Language and Literature.
59 Market Street, Bethlehem.

WILLIAM SUDDARDS FRANKLIN, M.S., SC.D.,
Professor of Physics.
127 Wall Street, Bethlehem.

JOHN L. STEWART, A.B., PH.B.,
Professor of Economics and History.
678 Ostrum Street, South Bethlehem.

ROBERT W. BLAKE, M.A.,
Professor of the Latin Language and Literature.
St. Luke's Place and Ostrum Street, South Bethlehem.

CHARLES J. GOODWIN, PH.D.,
Professor of the Greek Language and Literature.
118 Church Street, Bethlehem.

WILLIAM ESTY, S.B., M.A.,
Professor of Electrical Engineering.
21 South New Street, Bethlehem.

JOSEPH W. RICHARDS, M.A., A.C., M.S., PH.D.,
Professor of Metallurgy.
University Park, South Bethlehem.

HOWARD ECKFELDT, B.S., E.M.,
Professor of Mining Engineering.
438 Seneca Street, South Bethlehem.

ARTHUR E. MEAKER, C.E.,
Professor of Mathematics.
542 North Street, Bethlehem.

PRESTON A. LAMBERT, M.A.,
Professor of Mathematics.
215 South Centre Street, Bethlehem.

PHILIP M. PALMER, A.B.,
Professor of Modern Languages and Literatures.
61 Church Street, Bethlehem.

WILLIAM B. SCHOBER, B.S., A.M., PH.D.,
Professor of Chemistry.
844 Delaware Avenue, South Bethlehem.

BENJAMIN LEROY MILLER, PH.D.,
Professor of Geology.
672 Ostrum Street, South Bethlehem.

FRANK P. MCKIBBEN, S.B.,
Professor of Civil Engineering.
817 St. Luke's Place, South Bethlehem.

WINTER LINCOLN WILSON, C.E., M.S.,
Professor of Railroad Engineering.
18 South New Street, Bethlehem.

ROBERT C. H. HECK, M.E.,
Professor of Experimental Engineering.
819 St. Luke's Place, South Bethlehem.

WALTER W. DAVIS, B.S., A.B., PH.D.,
Professor of Physical Education.
449 Walnut Street, South Bethlehem.

PAUL BERNARD DESCHWEINITZ, M.E.,
Professor of Machine Design.
220 Wall Street, Bethlehem.

ROBERT W. HALL, A.M., PH.D.,
Assistant Professor of Biology.
401 East Broad Street, Bethlehem.

HARRY M. ULLMANN, A.B., Ph.D.,
Assistant Professor of Quantitative and Industrial Analysis.
148 South Main Street, Bethlehem.

JOHN HUTCHESON OGBURN, C.E.,
Assistant Professor of Mathematics and Astronomy.
462 Chestnut Street, South Bethlehem.

BARRY MacNUTT, E.E., M.S.,
Assistant Professor of Physics.
841 Seneca Street, South Bethlehem.

WALTER S. LANDIS, MET.E., M.S.,
Assistant Professor of Metallurgy and Mineralogy.
211 South New Street, Bethlehem.

MYRON J. LUCH, B.A., M.A., PH.D.,
Assistant Professor of English.
208 First Avenue, Bethlehem.

PERCY HUGHES, A.B., A.M., Ph.D.,
Assistant Professor of Philosophy, Psychology and Education.
434 Seneca Street, South Bethlehem.

LECTURERS.

EDWARD H. WILLIAMS, JR., B.A., E.M., A.C., F.G.S.A.,
Lecturer on Mining and Geology.
Andover, Mass.

WILLIAM L. ESTES, M.D.,
Lecturer on Physiology and Hygiene.
805 Delaware Avenue, South Bethlehem.

ALEXANDER MACFARLANE, M.A., D.Sc., LL.D.,
Lecturer on Mathematical Physics.
Chatham, Ont.

INSTRUCTORS.

NATT M. EMERY, M.A.,
Instructor in Public Speaking.
125 South High Street, Bethlehem.

EMIL GELHAAR,
Instructor in Freehand Drawing.
148 South Main Street, Bethlehem.

JAMES WARREN MILLER, B.S., M.A., PH.D.,
Instructor in Mathematics and Astronomy.
453 Walnut Street, South Bethlehem.

ALPHA A. DIEFENDERFER, A.C.,
Instructor in Assaying and Qualitative Analysis.
636 West Broad Street, Bethlehem.

JOHN E. STOCKER, B.S.,
Instructor in Mathematics.
321 North Centre Street, Bethlehem.

STANLEY S. SEYFERT, E.E.,
Instructor in Electrical Engineering.
138 South New Street, Bethlehem.

ARTHUR WARNER KLEIN, M.E.,
Instructor in Mechanical Engineering.
158 South New Street, Bethlehem.

OTTO C. BURKHART, B.S., E.M., C.E.,
Instructor in Metallurgy and Mineralogy.
9 South Centre Street, Bethlehem.

GEORGE C. BECK, A.C.,
Instructor in Chemistry.
414 Wyandotte Street, South Bethlehem.

CLARENCE E. CLEWELL, E.E.,
Instructor in Electrical Engineering.
138 South New Street, Bethlehem.

CHARLES SHATTUCK FOX, LL.B., A.M., PH.D.,
Instructor in Modern Languages.
222 Wall Street, Bethlehem.

CHARLES F. WOODS, A.B., PH.D.,
Instructor in Modern Languages.
22 South High Street, Bethlehem.

CHARLES K. MESCHTER, B.S., B.A., M.A.,
Instructor in English.
27 North New Street, Bethlehem.

EDWARD L. JONES, M.E.,
Instructor in Mechanical Engineering.
928 Delaware Avenue, South Bethlehem.

SIDNEY J. LOCKNER, A.M.,
Instructor in Mathematics and Astronomy.
526 Cherokee Street, South Bethlehem.

LEON D. CONKLING, C.E.,
Instructor in Civil Engineering.
829 Seneca Street, South Bethlehem.

SYLVANUS A. BECKER, C.E.,
Instructor in Civil Engineering.
103 North Street, Bethlehem.

LOWELL E. CONRAD, C.E.,
Instructor in Civil Engineering.
722 Cherokee Street, South Bethlehem.

ALBERT J. WILLIS, C.E.,
Instructor in Civil Engineering.
722 Cherokee Street, South Bethlehem.

FRANK RICHMOND INGALSBE, B.S., S.B.,
Instructor in Geology.
29 North New Street, Bethlehem.

VAHAN S. BABASINIAN, A.M., PH.D.,
Instructor in Chemical Philosophy and Organic Chemistry.
460 Chestnut Street, South Bethlehem.

JOSEPH DANIELS, S.B.,
Instructor in Mining Engineering.
Hotel Wyandotte, South Bethlehem.

FREDERICK S. BEATTIE, PH.B.,
Instructor in Chemistry.
112 North High Street, Bethlehem.

JAMES HUNTER WILY, E.E.,
Instructor in Physics.
704 Dakota Street, South Bethlehem.

JOSEPH B. REYNOLDS, B.A.,
Instructor in Mathematics.
323 Packer Avenue, South Bethlehem.

JOHN A. VEAZEY, A.B.,
Instructor in Physics.
222 South High Street, Bethlehem.

GEORGE E. STEBBINS, A.B., PH.D.,
Instructor in Physics.
222 South High Street, Bethlehem.

ROLLIN L. CHARLES, B.A.,
Instructor in Physics.
224 Lehigh Street, Allentown.

EDWARD S. FOSTER, E.E.,
Instructor in Electrical Engineering.
514 Dakota Street, South Bethlehem.

WILLIAM N. BERKELEY, B.S., PH.D.,
Instructor in Industrial Chemistry and Qualitative Analysis.
452 Vine Street, South Bethlehem.

RALPH J. GILMORE, B.A.,
Instructor in Biology.
B 37 Taylor Hall, South Bethlehem.

NEWTON W. BUCH, A.C.,
Instructor in Metallurgy and Mineralogy.
14 First Avenue, Bethlehem.

ARTHUR EDGAR, A.C.,
Assistant in Chemistry.
449 Vine Street, South Bethlehem.

THOMAS A. H. MAWHINNEY, B.A.,
Assistant in German.
542 Chestnut Street, South Bethlehem.

DUNLAP J. McADAM, JR., A.B., A.M., M.S.,
Assistant in Chemistry.
467 Vine Street, South Bethlehem.

ADMINISTRATIVE OFFICERS.

HENRY S. DRINKER, *President.*

JOSEPH F. KLEIN, *Dean of the Faculty.*

CHARLES L. THORNBURG, *Secretary of the Faculty.*

NATT M. EMERY, *Registrar and Assistant to the President.*

FREDERICK R. ASHBAUGH, *Secretary to the President.*

COMMITTEE ON ADMISSION.

PROFESSORS THORNBURG, THAYER, FRANKLIN, STEWART, BLAKE, GOODWIN, PALMER.
N. M. EMERY, *Secretary to the Committee.*

LIBRARY.

Director,
JOHN L. STEWART, A.B., PH.B.

Cataloguer,
A. W. STERNER.
116 North High Street, Bethlehem.

Shelf Clerk,
PETER F. STAUFFER.
512 Broadway, South Bethlehem.

PACKER MEMORIAL CHURCH.

Chaplain,
REV. STEWART U. MITMAN, PH.D.
432 Cherokee Street, South Bethlehem.

Organist,
T. EDGAR SHIELDS.
723 Cherokee Street, South Bethlehem.

LEHIGH UNIVERSITY.

ORIGIN.

The Hon. Asa Packer, of Mauch Chunk, during the year 1865, appropriated the sum of $500,000, to which he added one hundred and fifteen acres of land in South Bethlehem, to establish an educational institution in the Lehigh Valley. On this foundation rose Lehigh University, incorporated by the Legislature of Pennsylvania in 1866. In addition to these gifts, made during his lifetime, Judge Packer by his last will gave to the University an endowment of $1,500,000, and to the University Library one of $500,000.

DESIGN.

The original object of Judge Packer was to afford the young men of the Lehigh Valley a complete education, technical, literary and scientific, for those professions represented in the development of the peculiar resources of the surrounding region. In furtherance of this purpose instruction is liberally provided in Civil, Mechanical, Metallurgical, Mining, Electrical, and Chemical Engineering, Electrometallurgy, Chemistry, and in all needful collateral studies. A thoroughly equipped School of General Literature was also established, including the Classical and Latin-Scientific courses.

SITE.

South Bethlehem is situated at the junction of the Lehigh Valley, the New Jersey Central, and the Philadelphia and Reading Railroads, and the University buildings are about a half-mile from the station. New York is eighty-nine and Philadelphia fifty-seven miles distant.

The situation of the institution is healthful and beautiful. The region is famous for its mines and its railway and manufacturing enterprises.

TUITION AND OTHER FEES.

For students in the courses of Civil, Mechanical, Metallurgical, Mining, Electrical, and Chemical Engineering, and Electrometallurgy, the tuition fee is $150 for the year or $90 for either term; for students in the course of Chemistry, $100 for the year or $60 for either term; for students in the School of General Literature, $60 for the year or $40 for either term. A graduation fee of $10 must be paid by all candidates for a degree. A registration fee of $5 is charged yearly to each student when he enrolls.

The special deposits for materials and apparatus used in the various laboratories, etc., are given in connection with the description of the subjects under the List of Studies.

The tuition fees are payable to the Treasurer of the University in two instalments, on the opening day of the college year in September, and on the first day of the second term in February. The first instalment is $90, $60, or $40, according to the course, and the second $60, $40, or $20. Application may be made for a return of part of the tuition fee when a student has formally withdrawn from the University after less than four weeks' attendance in either term, but the amount thus refunded will in no case exceed one-half of the last instalment paid

Students who fail to pay tuition fees when due will be notified that their attendance at college exercises must be discontinued until payment is made.

PUBLIC WORSHIP.

Morning prayers are held in the Packer Memorial Church of the University, at which attendance is required.

BUILDINGS.

PACKER HALL.

This building, completed in 1869, is four stories in height, 215 feet long, and 60 feet wide. It is built of Potsdam sandstone in the English Gothic style of architecture, and occupies a commanding position, overlooking Bethlehem and South Bethlehem.

The department of Civil Engineering occupies the greater part of the basement, first floor, and second floor of Packer Hall. In the basement are the testing laboratories for cement, brick and

metals, which contain four machines for tensile and compressive tests, one for torsion tests, and special apparatus for experimental work. On the first floor are a lecture room, two recitation rooms, a large drawing hall, two instrument rooms, two offices and a library room. The instrument rooms contain seventeen transits, fourteen levels, a large geodetic theodolite, two plane tables, and other tools for engineering field work. In the library room is an excellent collection of plans of engineering structures. On the second floor are two drawing rooms, three recitation rooms, an instrument room, a blue-print room, and offices.

On the third and fourth floors are to be found the offices and recitation rooms of the department of Mathematics and Astronomy. The museum of Geology and Natural History is also on the third floor.

The building contains also the lecture and recitation rooms of the department of Latin.

THE CHEMICAL AND METALLURGICAL LABORATORY.

This is a thoroughly fire-proof building, built of sandstone, 219 feet in length by 44 in width, with a wing.

In the Chemical department there are two principal stories and a basement. The upper floor is occupied by the quantitative and the qualitative chemical laboratories. These rooms are 22 feet in height, and are well lighted and ventilated. Laboratories for industrial chemistry and physical chemistry and the supply room are also on this floor.

The first floor contains a large lecture room, a smaller lecture room, a recitation room, a chemical museum, and laboratories for organic and sanitary chemistry.

In the basement is the large laboratory for the furnace assay of ores and a well appointed laboratory for gas analysis; also rooms containing the apparatus for several processes in industrial chemistry, the engine and air pump for vacuum filtration, etc.

The Mineralogical and Metallurgical departments contain a lecture room, a blowpipe laboratory for class instruction in blowpipe analysis and in the practical demonstration of crystals and minerals; a museum for mineralogical and metallurgical collections; a mineralogical laboratory provided with a Fuess reflecting goniometer, Goldschmidt's "two-circle" reflecting and appli-

cation goniometers, a polariscope, a Groth's "universal apparat," and a Rosenbusch polarizing microscope; a dry laboratory provided with furnaces for solid fuel and for gas, with natural draught and with blast, electric current for electrometallurgical experiments, and a wet laboratory for ordinary analytical work. Equipment has recently been provided for laboratory work in metallurgy and particularly in electrometallurgy, consisting of working places for students, each equipped with gas, electric current, and apparatus for various kinds of experimental work; and several new pyrometers, calorimeters, and furnaces have been added to the general equipment. These departments are therefore well arranged and equipped for the instruction of classes in the courses of mineralogy, metallurgy, and blowpipe analysis of the regular curriculum, and to afford facilities to students for familiarizing themselves with the methods of measurement and research employed in mineralogy and metallurgy, and for conducting original investigations in these departments of science.

THE PHYSICAL AND ELECTRICAL ENGINEERING LABORATORY.

This building is 240 feet long, 44 to 56 feet wide, and four stories high. The halls and stairways, the photometer rooms, and all apparatus rooms are of fire-proof construction. The remainder of the building is of heavy mill construction.

On the first floor are the Senior dynamo laboratory and research room of the Electrical Engineering department, a workshop, stock rooms, and storage battery room belonging jointly to the departments of Physics and Electrical Engineering, and six laboratory rooms and a constant temperature vault belonging to the department of Physics.

The dynamo laboratory for Senior students in the west wing is supplied with power from a 40-horse-power steam engine and from a 75-kilowatt rotary converter receiving current from the University power plant through two 30-kilowatt transformers. The dynamo laboratory equipment, which is being constantly increased, now includes the following apparatus: an 18-kilowatt double-current generator supplying both direct and alternating current, a 15-kilowatt direct-current generator, three arc light dynamos, several types of open and enclosed arc lamps, two 7½-kilowatt rotary converters, a direct connected set of two series motors for railway motor tests, a storage battery booster set, twenty-eight direct-current generators and motors, ranging from

½ to 15 horse-power, twelve alternating current motors of from 1 to 15 horse-power, three dynamotors and motor-generators, a Brackett cradle dynamometer, five alternators, including a 10-kilowatt Ferranti machine, a 35-kilowatt Westinghouse machine, and a 9-kilowatt Thomson-Houston machine, nineteen transformers of from 1 to 15 kilowatts capacity, including two 15-kilowatt Scott phase transformers designed for a wide range of voltages, a 6-light constant current transformer with a full equipment of series enclosed arc lamps, and a variety of instruments including voltmeters, ammeters, wattmeters, rheostats, contact makers, frequency meters, dynamometers, tachometers, condensers, and other apparatus.

On the second floor are the offices of the departments of Physics and of Electrical Engineering, two general apparatus rooms, one large laboratory room for physics, including four photometer rooms; and a drafting room, a seminary room, and a large dynamo laboratory for electrical engineering.

The dynamo laboratory for Junior students in the west wing is equipped with five motor driven generator sets, two engine driven sets, and eight other direct current machines.

On the third floor are the lecture room, with apparatus rooms adjoining, and three laboratory rooms for advanced work belonging to the departments of Physics and Electrical Engineering, a recitation room, and a large audience hall.

On the fourth floor, well lighted by dormer windows and skylights, are four recitation rooms in the central portion of the building and a large laboratory room for Physics in the west wing.

THE W. A. WILBUR ENGINEERING LABORATORY AND POWER HOUSE.

The laboratory portion of this building was erected in 1902; in 1907 the original building was doubled in size, the addition containing the new heating and lighting plant of the University. The building is of sandstone, conforming in material to the adjacent Chemical and Physical Laboratories. It is 44 feet wide by 188 feet long, one story high in the boiler room, but with a raised engine room forming a second story at either end.

The boiler equipment of the laboratory consists of two water-tube boilers rated at about 100 horse-power each, one of Babcock & Wilcox type, the other of Stirling make. In the heat and light plant there are three 250 horse-power Stirling boilers, with room

for a fourth unit of equal or greater capacity. Each section has its own set of feed pumps and other auxiliaries, in the arrangement of which especial provision has been made for easily conducting performance tests. The laboratory boilers are connected to the chimney of the old boiler house, and have also an induced draft outfit. The chimney of the newer plant is of radial brick construction, 125 feet high, and a forced draft equipment is to be installed when need for increased capacity arises.

A coal-storage yard north of the building has room for a season's supply of coal, and a system of belt-conveyors and bucket-elevator is provided for receiving coal, dumping it on the storage pile, and conveying it into the boiler-room as needed.

The engine room of the laboratory, 50 feet long, contains a vertical triple-expansion engine of 75 horse-power, a 60 horse-power compound two stage Ingersoll air compressor, a small tandem-compound yacht engine, a simple Ball engine direct connected to a 25 kilowatt Crocker-Wheeler generator, and a 5 horse-power De Laval steam turbine. There is also a complete set of Westinghouse air-brake apparatus, with four freight-car brakes. The air-brake pump and all the other steam motors, including the feed and condenser pumps, are piped to surface condensers beneath the engine room floor. There are two large condensers of 150 and 60 horse-power capacity respectively, with smaller ones for the pumps and for special experiments. Besides the various engines there is apparatus for testing gages, indicators, thermometers, steam calorimeters and other instruments, and for experiment on flow of steam, for testing injectors, etc. The exhaust system includes a Cochrane feed-water heater of 250 horse-power capacity.

The engine room of the power house is 31 feet long, with concrete floor. The generating units now installed are of 50 and 100 kilowatt rating, and there is room for a third of larger size. Simple horizontal Ball engines are direct connected to General Electric alternating current generators, which will furnish 60 cycle two-phase current at 2300 volts for transmission to the various distributing centers. An engine-driven and a motor driven exciter, with the switchboard, complete the electrical equipment. The engines exhaust through a Cochrane heater, and the exhaust steam will be discharged directly into the low-pressure system during the heating season.

The abandonment and dismantling of the old boiler plant will render available for laboratory use a floor space 45 feet by 70

feet in the old boiler house. This will be used for apparatus and experiment in gas-power engineering and hydraulics, and for a number of the minor thermodynamic experiments with steam.

This building bears the name of W. A. Wilbur in grateful recognition of the work he has done for Lehigh University.

WILLIAMS HALL.*

This building is 186 feet long by 70 feet wide and covers a ground area of over 12,000 square feet. One-half of the building is devoted to the department of Mechanical Engineering and the other half to Geology, Biology, Mining Engineering, Economics and History.

In the eastern end are located the recitation rooms, instructors' offices, drawing rooms, reference library, and store rooms of the department of Mechanical Engineering, and in the basement rooms and apparatus are provided for laboratory work in experimental mechanics and engineering physics, such as the calibration of the measuring instruments used in Mechanical Engineering, the determination of the mechanical efficiencies of hoisting and other gear, and the testing of motors and other prime movers than steam engines. In this section there are 4-cycle and 2-cycle gas engines, hot-air pumping engines, electric motors, a water motor, a 15-horse-power centrifugal pump, hoists, blocks, jacks, and dynamometers of various kinds.

In the west end the department of Geology has on the first floor two lecture rooms, office, library, and laboratory of petrology. The larger of the two lecture rooms is fitted with collections of fossils, rocks, and economic minerals; the smaller room is equipped with a study collection of rocks containing over five thousand specimens collected from the type regions in different parts of the world; both rooms are fitted with stereopticon for illustrated lectures. The laboratory of petrology is provided with twelve high-grade petrographic microscopes, a microprojection apparatus for lecture purposes, and study collections of rocks and thin sections. In the basement are a laboratory for instruction in lithology, a room devoted to working collections and field equipment for Geology and Economic Geology, and an apparatus for cutting thin sections of rocks, with a one-horse-power motor for furnishing power. On the third floor is a laboratory devoted to the use of students of field geology.

*Named for Prof. E. H. Williams, jr.

The department of Mining Engineering has its office, library, and recitation rooms on the first floor. A large room in the well-lighted basement is used for illustrative material and contains a large size and a small size Ingersoll-Rand Rock Drill, an Ingersoll-Rand Pick Machine for coal mining, a Water-Leyner Rock Drill, a Sullivan hand-power diamond drilling machine, and a Phillips Automatic Cross-over Car Dump with a full-sized mine car. A pipe line carries compressed air from the Steam Engineering Laboratory for operating the rock drills. The equipment for Mine Surveying and Railroad Surveying contains, among other standard instruments, a complete C. L. Berger & Son's Mining Transit with auxiliary top and side telescope and solar attachment. On the third floor are located the drawing room and office, also well-equipped blue-print and dark rooms and a photographic laboratory used jointly by the Departments of Mining and Geology.

The department of Biology has its lecture room, store rooms, office, reference library, and laboratories on the second floor, and a large vivarium on the third floor. The laboratories of this department are thoroughly equipped with collections, sections, microscopes, and necessary appliances.

Two students' rooms, used by the Mining and Geological Society and by the Mechanical Engineering Society, are located in the basement.

SAUCON HALL.

Extensive alterations to this building were made in 1896, adapting it to the needs of the department of English. It contains a study and a recitation room for each instructor, a lecture hall seating 200 persons, and a large room on the ground floor which has been fitted up for the use of the literary societies, with committee rooms adjoining. The Department of Greek is also accommodated in this building.

CHRISTMAS HALL.

This building is devoted to the departments of Modern Languages and of Philosophy, Psychology and Education. On the ground floor are the offices, departmental library and recitation rooms of the department of Modern Languages.

Psychological Laboratory and Practice School. The psychological laboratory is situated on the third floor of this building. It is equipped for elementary instruction and experimentation in the

physiology of sense and movement. Opportunities for brain dissection are provided. The practice school meets in this building. It is attended by young men of the vicinity, who seek instruction in grammar and high school subjects. It is taught by students in Education, under the supervision of the instructor.

THE SAYRE OBSERVATORY.

By the liberality of the late Robert H. Sayre, Esq., one of the Trustees of the University, an Astronomical Observatory was erected on the University grounds, and placed under the charge of the Professor of Mathematics and Astronomy.

The Observatory contains an Equatorial Telescope, by Alvin Clark, of six inches clear aperture and of eight feet focus; a Zenith Telescope, by Blunt; a Superior Astronomical Clock, by William Bond & Sons; a Meridian Circle; and a Prismatic Sextant, by Pistor and Martins.

Students in practical astronomy receive instruction in the use of the instruments and in actual observation.

The land upon which the Observatory stands, consisting of seven acres adjoining the original grant, was presented to the University by Charles Brodhead, Esq., of Bethlehem.

Sayre Observatory Annex.

This building contains a modern zenith telescope of four and one-half inches clear aperture equipped with electric illumination. The building and instruments were presented to the University by Robert H. Sayre, Esq., July 23, 1903.

Observations secured with this instrument are for the purpose of investigating the Variation of Latitude.

THE PACKER MEMORIAL CHURCH.

The Packer Memorial Church is the munificent gift of Mrs. Mary Packer Cummings, daughter of the Founder of the University. It is one of the largest and most magnificent churches in the State.

THE UNIVERSITY LIBRARY.

The Library building was erected by the Founder of the University in 1877, at a cost of $100,000, as a memorial of his daughter, Mrs. Lucy Packer Linderman, and during the same year more than $20,000 was contributed by her family and friends as a memorial fund for the purchase of books.

The building is semi-circular in plan, with a handsome façade in the Venetian style of architecture. It is constructed of Potsdam sandstone with granite ornamentation. In the interior the center is occupied by a reading space, 40 by 50 feet, from which radiate the book cases, extending from floor to ceiling; two galleries affording access to the upper cases. Shelf room is now provided for one hundred and sixty thousand volumes. The building is thoroughly fire-proof, well lighted, and heated by steam.

One hundred and twenty-three thousand volumes are now upon the shelves, including many extremely valuable books. The list of periodicals numbers about four hundred, embracing as far as possible all departments of knowledge.

The Library is open from 8 A.M. to 6 P.M., except Sundays, Thanksgiving Day and Good Friday, when the hours are from 1:30 P.M. to 6 P.M. Fourth of July, Christmas Day, and New Year's the building is closed all day.

The free use of the Library, with the privilege of taking out books, is offered to students of every department on presentation of their registration card. The use of the books and of the periodicals within the building is free to all persons. Resident graduates of the University have the full use of the Library on payment of three dollars annually, and other persons, at the discretion of the Director, on the same terms, upon presentation of a written statement, endorsed by an officer of the University, setting forth their reasons for desiring this privilege. Any person, pursuing systematic investigations in any study, may be allowed the full use of the Library for a period not exceeding three months without fee. At the discretion of the Director, a deposit may be required when books are issued.

The Eckley B. Coxe Memorial Library.

In memory of the Honorable Eckley B. Coxe, who was for many years a Trustee of the University and who was profoundly interested in its welfare, Mrs. Coxe presented to the University his technical library, consisting of 7727 volumes, together with 3429 pamphlets. As the working library of a man who was remarkable as well for the breadth of his culture as for the extent and thoroughness of his acquaintance with the whole field of applied science, this addition to the resources of the University possesses the greatest value for all professional students.

GYMNASIUM.

The University gymnasium is a substantial building, thoroughly equipped with modern appliances. It is furnished with the best quality of apparatus for calisthenic and heavy gymnastics, both for individual and for class work, basket-ball and hand-ball courts and running track, and is provided with hot and cold shower baths, and lockers.

TAYLOR HALL.

This building, the gift of Mr. Andrew Carnegie, is a commodious concrete structure situated in the University Park, south of Packer Hall, and contains rooms suitable for the accommodation of about 140 students with suites of three rooms, a study and two adjacent bed rooms, for two occupants, and a few single rooms. Rates may be had on application. They are fixed as nearly at cost as possible.

DROWN MEMORIAL HALL.

This building, erected as a memorial to the late President Thomas M. Drown, is devoted to the social interests of the University students. It contains study, reading, conversation, and chess rooms, an assembly hall, and the offices of the Alumni Association, the Young Men's Christian Association, the Athletic Committee, the College Publications, the Dramatic and Musical Organizations. It also accommodates the Supply Bureau, conducted by students of the University.

THE COLLEGE COMMONS.

The Commons furnishes a place where students may obtain wholesome food at cost. Four hundred students may be accommodated.

ATHLETIC FIELD.

An Athletic field is provided by the University for the accommodation of students who wish to participate in the various outdoor sports. Football, baseball, and lacrosse fields are provided, also a quarter-mile running track. Bleachers and grandstands furnish seating capacity for about 7000 spectators.

A Field House, fitted with 80 steel lockers and 10 hot and cold water shower baths supplied by spring water, furnishes accommodations for the various athletic teams.

A Cage with 60 by 120 feet floor space is provided for indoor baseball, lacrosse, and track and field sports practice.

All athletic sports are directed and controlled by an Athletic Committee composed of members of the Faculty, Alumni, and students.

EXPENSES.

Books, stationery, and drawing instruments are provided by the students. Materials consumed in the laboratories can be obtained from the University, their value being covered by a deposit made at the opening of that term in which the laboratory work is to be done. These deposits for the various laboratories are given under the detailed statement of laboratory courses in the List of Studies.

Rooms and board can readily be obtained in many private houses in South Bethlehem and Bethlehem. A limited number of students are accommodated in Taylor Hall. Any desiring to do so may obtain table board at the College Commons.

Necessary expenses for the collegiate year, clothing and traveling not included, are estimated at $400 to $550. This includes attendance at the required summer schools.

DATE OF EXAMINATIONS.

Examinations for admission to the University will be held in 1908 on Wednesday, Thursday, Friday, and Saturday, June 10, 11, 12, and 13, and on Friday, Saturday, Monday, and Tuesday, September 11, 12, 14, and 15.

The examinations are held in June and September in the following order:

First Day.—Geometry, 8 A.M.; Physics, 2 P.M.; Latin and Roman History, 2 P.M.

Second Day.—Elementary Algebra, 8 A.M.; Advanced Algebra, 2 P.M.

Third Day.—Trigonometry, 8 A.M.; German or French, 2 P.M.; Greek and Greek History, 2 P.M.

Fourth Day.—English, 8 A.M.; American History, 2 P.M.

Candidates for admission wishing to obtain credit for any subject of the first term of the Freshman year should notify the Registrar before September 11. Students, properly qualified, will be examined in Elementary Chemistry on the first Saturday of

the term; those passing the examination will take Theoretical Chemistry during the first term.

Each candidate for admission must be at least sixteen years of age, and must present a testimonial of good moral character from his latest instructor.

Certificates of the College Entrance Examination Board are accepted in lieu of the entrance examinations held at the University in those subjects in which the recorded grade is C (60 per cent.) or over.

THE SCHOOL OF GENERAL LITERATURE.

THE CLASSICAL COURSE.

Candidates for admission to the Classical Course are examined in the following subjects:

1. *English.*—This requirement includes: (*a*) *English Grammar*, especial attention being given to the analysis and correction of sentences; (*b*) *Rhetoric.* Any approved High School Rhetoric will be sufficient, together with practical exercises in composition; (*c*) *Composition* and *College Requirements.*

Greater stress will be laid, year by year, upon accurate and idiomatic use of the vernacular, upon correct punctuation, clearness and facility in expression and in the presentation of ideas, an acceptable style of writing—in short, upon all that may fairly be expected of the student as the result of a thorough and intelligent preparation in English. To gain this end, it may be well to use the list of books suggested by the Joint Committee of Colleges and Preparatory Schools for admission to the colleges of the Middle States. From one of the books in their list required for study and practice, a theme will be taken for the composition which forms a part of the examination paper.

2. *History.*—This requirement includes: (*a*) *Greek History* to the death of Alexander, with due reference to Greek life, literature, and art. (As in Botsford, Myers, or Oman, with Mahaffy's Old Greek Life); (*b*) *Roman History* to the accession of Commodus, with due reference to literature and government. (As in Myers's Rome or Allen's History of the Roman People, pp. 1-242, and in Preston and Dodge's Private Life of the Romans); (*c*) *American History*, with the elements of civil government. This includes colonial history with a view to the origin and development of our institutions, and the period of discovery and early settlement, so as to set forth the relations of peoples in America and the meaning of the struggle for mastery. (As in Channing, McMaster, Thomas, or McLaughlin.) Throughout this examination special emphasis will be laid on knowledge of the physical and political geography of the countries concerned.

3. *Algebra.*—Fundamental principles. Factoring. Least common multiple. Greatest common divisor. Fractions. Involution. Evolution. Radicals. Imaginary quantities. Equations of the first and second degrees. Ratio. Proportion and progressions.

4. *Plane Geometry.*—Fundamental principles. Rectilinear figures. The circle. Proportional lines and similar figures. Comparison and measurement of the surfaces of rectilinear figures. Regular polygons. Measurement of the circle. Maxima and minima of plane figures, and plane and polyhedral angles.

Candidates must have a knowledge of the metric system and be prepared to solve problems in either Algebra or Geometry involving the use of the metric units.

5. *Latin Grammar.*

6. *Caesar,* four books of the Gallic War.

7. *Cicero,* six orations, including the four against Catiline.

8. *Vergil,* the first six books of the Aeneid, including Prosody.

9. The translation, at sight, of passages from Caesar and Cicero.

10. The translation of English into Latin.

11. *Greek Grammar.*

12. *Xenophon,* Anabasis, four books.

13. *Homer,* Iliad, first three books, including Prosody. The Catalogue of ships may be omitted.

14. The translation, at sight, of a passage from some work of Xenophon.

15. The translation of simple English into Greek.

Candidates for admission to the Classical Course who have had, in their preparatory schools, no opportunity of studying Greek but who desire to take up that study in the University, are, at present, admitted to that course in full standing upon presenting the subjects required for admission to the Latin-Scientific Course. They will begin Greek in the Freshman year and study it throughout the course.

THE LATIN-SCIENTIFIC COURSE.

Candidates for admission to this course must present the first ten of the above requirements, but substitute for the Greek sections (numbers 11-15 inclusive) the following work:

16. *Solid Geometry.*

17. *Plane Trigonometry and Logarithms.*—Through the solution of right and oblique triangles. Candidates must bring their logarithmic tables to the examination.

18. *German* or *French.* The equivalent to Part I of Joynes-Meissner's or Calvin Thomas's Grammar, together with about 500 pages of standard German authors; or, if French is offered, an amount equivalent to Fraser and Squair's French Grammar,

together with about 800 pages of modern French authors. This requirement implies, in general, two years' academic work.

THE SCHOOL OF TECHNOLOGY.

Candidates for admission to the Courses in Civil Engineering, Mechanical Engineering, Metallurgical Engineering, Electrometallurgy, Mining Engineering, Electrical Engineering, Chemistry, and Chemical Engineering are examined in the following subjects:

1. *English.*—This requirement includes: (*a*) *English Grammar*, especial attention being given to the analysis and correction of sentences; (*b*) *Rhetoric.* Any approved High School Rhetoric will be sufficient, together with practical exercises in composition; (*c*) *Composition* and *College Requirements.*

Greater stress will be laid, year by year, upon accurate and idiomatic use of the vernacular, upon correct punctuation, clearness and facility in expression and in the presentation of ideas, an acceptable style in writing—in short, upon all that may fairly be expected of the student as the result of a thorough and intelligent preparation in English. To gain this end, it may be well to use the list of books suggested by the Joint Committee of Colleges and Preparatory Schools for admission to the colleges of the Middle States. From one of the books in their list required for study and practice, a theme will be taken for the composition which forms a part of the examination paper.

It is recommended that candidates have some knowledge of Latin, although an examination in it is not required for any courses except the Classical and Latin-Scientific.

2. *American History*, with the elements of civil government. This includes colonial history, with a view to the origin and development of our institutions, and the period of discovery and early settlement, so as to set forth the relations of peoples in America and the meaning of the struggle for mastery. (As in Channing, McMaster, Thomas, or McLaughlin.) Throughout this examination special emphasis will be laid on knowledge of the physical and political geography of the countries concerned.

3. *Elementary Algebra.*—Fundamental principles. Factoring. Least common multiple. Greatest common divisor. Fractions. Involution. Evolution. Radicals. Imaginary quantities.

Equations of the first and second degrees. Ratio. Proportion and progressions.

4. *Advanced Algebra.*—Binominal Theorem for any exponent, Logarithms, Compound Interest and Annuities, Theory of Quadratic Equations, Variation, Indeterminate Equations, Inequalities, Undetermined Co-efficients and Partial Fractions.

5. *Geometry.*—Fundamental principles. Rectilinear figures. The circle. Proportional lines and similar figures. Comparison and measurement of the surfaces of rectilinear figures. Regular polygons. Measurement of the circle. Maxima and minima of plane figures, and plane and polyhedral angles. Solid geometry.

Candidates must have a knowledge of the metric system and be prepared to solve problems in either Algebra or Geometry involving the use of the metric units.

6. *Plane Trigonometry and Logarithms.*—Through the solution of right and oblique triangles. Candidates must bring their logarithmic tables to the examination.

All mathematical subjects should be thoroughly reviewed in last year's work of the preparatory school. For those who expect to enter on certificate this review is required.

7. *Elementary Physics.*—This requirement may be met by a good course in any of the standard High School text-books in Physics, such as Gage's Elements of Physics, Carhart and Chute's Physics, or Avery's Elements of Natural Philosophy. Ability to solve simple numerical problems is required. In case the candidate has done laboratory work in Physics he should submit his laboratory note book at the time of his examination for entrance.

8. *German.*—An amount equivalent to Part I of Joynes-Meissner's or Calvin Thomas's Grammar, and the reading of not less than 200 octavo pages of standard German texts.

An equivalent amount of French will be accepted in cases in which it is inconvenient for the candidate to offer German. The amount thus required in French is equivalent to Fraser and Squair's Grammar and the reading of not less than 200 octavo pages of modern French.

DIVISION OF EXAMINATIONS FOR ADMISSION.

Candidates for admission to the Freshman Class may pass all the examinations in June, or all in September, or some in June and the rest in September of the year of entrance, or may take

them in *two consecutive years.* In the last case, for all courses candidates may present themselves for examination in the first year in the following subjects: Plane Geometry, English, and History. In addition, candidates for the Classical and Latin-Scientific Courses may present themselves for examination in the first year in Latin Grammar, Caesar, Cicero; and one of the following: (*a*) Greek Grammar and three books of Anabasis; (*b*) German: the equivalent of one year's work; (*c*) French: the equivalent of one year's work.

Candidates intending to enter the University in September are advised to present themselves for examination in June; if they are not fully prepared at that time they will receive credit for the examinations then satisfactorily passed.

ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced studies in any course are required to pass *in addition to the entrance examinations for that course,* examinations in the work already done by the classes which they desire to enter. These examinations are held on the same days as those for entrance to the Freshman Class. The additional subjects may be found in the schedule of studies of the different departments.

A student from another College or University is admitted without entrance examinations, provided he has covered the entrance subjects required at this University. Evidence to that effect, together with a letter of honorable dismissal from his college, should first be filed with the Registrar. If these are satisfactory, the applicant will receive a certificate that the entrance requirements of this University are satisfied.

Applicants who have obtained this certificate and who desire to enter the Freshman or Sophomore class in February, must report personally to the Secretary of the Faculty on or before the Wednesday preceding the opening of the second term. Those who desire to enter the Sophomore or Junior class in September must report personally in June not later than the Thursday preceding University Day, or in September not later than the Thursday preceding the opening of the first term. For those applying after these dates an entrance fee of twenty-five dollars will be charged.

The Secretary of the Faculty will issue to the applicant a paper authorizing him to confer with the professors regarding the subjects already taken by the class that he desires to enter.

It is necessary for an applicant to bring a certificate naming the subjects completed at another college, together with a copy of the catalogue or register of the college; and it is desirable for him to bring samples of his drawings, field notes, computations and laboratory work for inspection, and personal certificates from his teachers showing the grades attained at the college from which he comes. Professors may admit the student to advanced standing if satisfied with these evidences of proficiency, or they may find it necessary to give a formal examination in the subjects for which he desires credits.

Professors will note their conclusions on the paper furnished the applicant, who must return the same to the Secretary of the Faculty within three days from its date of issue. If all the subjects are accepted the applicant will be admitted in full standing to the Freshman, Sophomore, or Junior Class, as the case may be. If nearly all are accepted, the candidate may be admitted with conditions, and the Secretary of the Faculty will inform him of the rules applicable to conditioned students.

ADMISSION TO GRADUATE COURSES.

Students of this University who have taken their first degree, and others, on presenting a diploma of an equivalent degree conferred elsewhere, are admitted to advanced studies, according to the plan to be found on page 32 under the general subject of Graduate Courses.

PREPARATORY SCHOOL CERTIFICATES.

The University has no permanent arrangement with any preparatory school whereby certificates are accepted in lieu of entrance examinations, and the acceptance of certificates for any student in any subject must be the result of a special arrangement between the Principal of the school and the Committee on Admission.

EXAMINATIONS AT SCHOOLS.

When desired by the Principals, arrangements will be made to hold at the schools the June examinations for admission to the University. Such requests should be made before June 1st.

HONOR SYSTEM.

The Honor System is in force at Lehigh University, having been adopted by the unanimous action of the student-body.

LIST OF STUDIES.

Following is a complete list of studies offered by the University in its various courses. The number of exercises per week in each subject is indicated by the figure in parentheses. Two hours of drawing, three of work in the laboratory or three of practice in the field are regarded as equivalent to a recitation or lecture of one hour's duration.

GRADUATE COURSES.

The degree of Master of Arts is conferred upon any candidate, otherwise properly qualified, who, after having taken the degree of Bachelor of Arts at any College or University, shall pursue for at least one year at this University a course of liberal study in two departments (under two professors), pass the examinations of the same, and present a satisfactory thesis.

In exceptional cases graduates of this University who are candidates for the degree of Master of Arts will be allowed to study in non-residence.

The degree of Master of Science is conferred upon any candidate, otherwise properly qualified, who, after having taken the degree of Bachelor of Science or a degree in technology at any College or University, shall pursue for at least one year at this University a course of advanced study in two departments (under two professors), pass the examinations of the same, and present a satisfactory thesis.

The tuition fee is $50 a year and the graduation fee is $10. No tuition fee is charged to students pursuing graduate work in non-residence, but the graduation fee is $30, and at least two years are required to complete the course.

The course of study may be selected, with the approval of the Faculty, from the following list of subjects, at least fifteen exercises per week being chosen in two departments. About two-thirds of the work is to be in one department and about one-third in another, these being called major and minor depart-

ments. The thesis is to be prepared on a subject connected with the studies of the major department. The candidate is required to satisfy each professor that he is fully competent to pursue the subjects selected.

Candidates who desire to receive the Master's degree in June, 1909, are required to confer with the professors on or before September 19, 1908, and to present their courses of study to the Faculty for approval on September 21, 1908.

The following subjects are now offered by the University; other allied subjects may in some cases be selected by candidates after conference with the professors in charge.

IN MATHEMATICS AND ASTRONOMY.

Practical Astronomy.

PROFESSOR THORNBURG.

The work embraces: (*a*) The study of instruments and methods used in the determination of time, latitude, longitude, and azimuth; (*b*) Practical work in the observatory, securing facility in making and reducing observations. Two terms (5).

Differential Equations.

PROFESSOR LAMBERT.

The course in Differential Equations is based on Johnson's Differential Equations and Byerly's Spherical Harmonics. Collateral reading in the University Library is required. Two terms (3).

Analytic Mechanics.

DR. MILLER.

Elementary and Advanced Rigid Dynamics; Potential Functions, based on Love's Theoretical Mechanics; Williamson and Tarleton's Dynamics; and Routh's Dynamics. Two terms (3).

IN ENGLISH.

English Literature.

PROFESSOR THAYER.

An advanced course in branches which have not formed a part of the undergraduate work of the candidate, the details of which will be arranged after a personal conference. Two terms (5).

Anglo-Saxon.

MR. MESCHTER.

Anglo-Saxon poetry and prose above the grade of undergraduate work, from both the literary and the historical point of view. Two terms (5).

Sanskrit.

PROFESSOR THAYER.

Beginners' Course. Perry's Primer. Lanman's Reader. Whitney's Grammar. Two terms (5).

ASSISTANT PROFESSOR LUCH.

Advanced Course. Whitney's Grammar, the Hitopadeça, and the Sakuntala. Two terms (5).

IN PHYSICS.

Theoretical Physics.

PROFESSOR FRANKLIN.

This embraces: (*a*) the theory of heat, based upon Preston's theory of Heat and Buckingham's Thermodynamics; (*b*) The theory of electricity and magnetism, based upon Maxwell's Treatise, J. J. Thompson's Recent Researches, and Webster's Electricity and Magnetism; or (*c*) The theory of light and sound, based upon Preston's Theory of Light and Helmholtz's Tonempfindungen. Two terms (4).

Physical Research.

PROFESSOR FRANKLIN.

This course consists of original investigations in experimental physics. Two terms (3).

IN ECONOMICS AND HISTORY.

Political Economy.

PROFESSOR STEWART.

This course embraces: (*a*) The rise and development of economic systems and economic thought. (*b*) The scope and method of political economy. Patten's Development of English Thought and the works of Keynes, Cohn, and Ingram on Political Economy will be used. Two terms (5).

American History.

PROFESSOR STEWART.

An examination of the influence of the economic development of the Union upon the legal and political theories incorporated in the Constitution. Two terms (5).

Politics.

PROFESSOR STEWART.

The history of the attempt to treat in a systematic way the problems of political organizations. Pollock's History of the Science of Politics and Sidgwick's Elements of Politics. Two terms (5).

IN LATIN.

Roman Law.

PROFESSOR BLAKE.

(*a*) Roman law before Justinian; based on Bruns's Fontes Juris Romani Antiqui, and Mommsen's Abriss des römischen Staatsrechts. (*b*) Justinian's Institutes, Morey's Outlines of Roman Law, and collateral reading. Two terms (4).

Roman Philosophy.

PROFESSOR BLAKE.

(*a*) Cicero, De Legibus and De Natura Deorum; History of Roman Philosophy. (*b*) Selected readings from Seneca. Two terms (3).

Roman Literature.

PROFESSOR BLAKE.

(*a*) History of Roman literature. (*b*) Readings from Latin authors not previously read in course, as far as practicable paralleling the work in (*a*). Two terms (3).

IN GREEK.

Hellenistic Greek.

PROFESSOR GOODWIN.

Gospel of St. Mark, Acts, and selected Epistles of the New Testament. Thayer's Lexicon. Blass's Grammar of New Tes-

tament Greek. Patristic literature. Collateral reading. Selections from Lucian. Two terms (5).

Dramatic Poetry.

PROFESSOR GOODWIN.

Several plays of Aeschylus, Sophocles, Euripides, and Aristophanes. Aristotle's Poetics. Collateral reading. Two terms (5).

Greek Philosophy.

PROFESSOR GOODWIN.

Plato's Republic and other works. Aristotle, selections. Ritter and Preller's Historia Philosophiae Graecae. Zeller's History of Greek Philosophy, and other collateral reading. Two terms (5).

IN ELECTRICAL ENGINEERING.

Theory of Alternating Currents and Alternating Current Machinery.

PROFESSOR ESTY.

This course is based upon the works of Arnold, Bedell and Crehore, Steinmetz, and Franklin and Williamson. Two terms (4).

Electrical Design.

PROFESSOR ESTY.

This course consists of predeterminations by calculation of the characteristics, regulation and performance of electrical machinery. Analysis and use of designing constants. Design of special machines. Two terms (3).

Electric Traction.

PROFESSOR ESTY, MR. SEYFERT.

The development of an electric railway project. Design of station and distribution system. Operating characteristics of direct and alternating current railway motors. Predetermination of motor equipments and run curves for given schedules and traffic. Choice of system. Estimates of cost. Two terms (3).

Electrical Testing.

PROFESSOR ESTY, MR. SEYFERT.

Special experimental research in electrical engineering; tests of the magnetic properties of iron and steel; investigation of the

series single-phase alternating current motor; leakage reactance of induction motors; regulation of alternators; polyphase testing; electric railway testing. Two terms (3).

IN METALLURGY.

Thermo-Chemistry and Thermodynamics of the Metals.

PROFESSOR RICHARDS, ASSISTANT PROFESSOR LANDIS.

A study of the melting points, boiling points, scientific heats, and latent heats of fusion and of vaporization of the metals, from a practical and theoretical standpoint. Also, of the heat of formation of compounds of the metals, and the relations of these to atomic weights and other chemical and physical properties. Lectures and laboratory work. First term (5).

Thermo-Chemistry and Physics of Metallic Alloys.

PROFESSOR RICHARDS, ASSISTANT PROFESSOR LANDIS.

A study of the physical and chemical properties of metallic alloys, their melting points, specific heats, latent heat of fusion, heats of formation and microscopic structure. Lectures and experimental work in the same. Second term (5).

Electrometallurgy.

PROFESSOR RICHARDS, ASSISTANT PROFESSOR LANDIS.

A study of the conditions of deposition of pure metals in electrolysis, electrolytic separations, formation of metallic compounds by electrolysis, energy absorption in electrolysis. Lectures and laboratory work. First term (5).

IN MINERALOGY.

Geometric Crystallography.

PROFESSOR RICHARDS, ASSISTANT PROFESSOR LANDIS.

An advanced course in mathematical crystallography, including practical instruction in the measurement, calculation, projection and drawing of crystals. Reference books: Mallard's Crystallographie Géométrique and Liebisch's Geometrische Krystallographie. First term (5).

Physical Crystallography.

PROFESSOR RICHARDS, ASSISTANT PROFESSOR LANDIS.

A description and discussion of the physical properties of crystals, with practical instruction in the determination of the optical constants of crystals. Reference books: Mallard's Crystallographie Physique, Liebisch's Physikalische Krystallographie, Groth's Physikalische Krystallographie. Second term (5).

IN MINING ENGINEERING.

Mining Methods.

PROFESSOR ECKFELDT, MR. DANIELS.

The study of methods used in a given mining region, or in the production of a given class of mineral, with respect to conditions influencing choice of method, and cost. Two terms (3).

Mining Plant.

PROFESSOR ECKFELDT, MR. DANIELS.

The determination of the efficiency of mining machinery of given types under varying conditions. Two terms (2).

Dressing Plant.

PROFESSOR ECKFELDT, MR. DANIELS.

The study of certain operations incident to the dressing of ores or the preparation of coal. Determination of efficiency of processes. Losses in dressing. Two terms (2).

IN MODERN LANGUAGES.

French.

PROFESSOR PALMER, DR. WOODS.

An advanced course in the French language and literature. The course will be arranged with each candidate individually upon application. Two terms (5). Also see courses 79 to 83, on page 48.

German.

PROFESSOR PALMER.

An advanced course in the German language and literature. The course will be arranged with each candidate individually upon application. Two terms (5). Also see courses 102 and 103, on page 49.

IN CHEMISTRY.

Advanced Industrial Chemistry.

PROFESSOR SCHOBER, DR. BERKELEY.

This course involves the study of some industry dependent upon chemical principles and consists of practical experimental and analytical work in the laboratories, inspection of manufacturing establishments, and study of the technical journals and other publications. Two terms (10).

Advanced Organic Chemistry.

PROFESSOR SCHOBER, DR. BABASINIAN.

This course consists of original investigations in organic chemistry. Two terms (10).

Advanced Inorganic Chemistry.

ASSISTANT PROFESSOR ULLMANN.

Study and comparison of known methods of quantitative analysis and the development of new methods. Two terms (10).

The Rare Elements.

MR. MC ADAM.

The study of the properties and reactions of these elements and the preparation of some of their compounds. Two terms (10).

IN GEOLOGY.

Geology.

PROFESSOR MILLER, MR. INGALSBE.

Field investigation and study of the literature of some special geological problem. This will comprise field and laboratory work on some district in the vicinity of the University. A map of a limited area will be constructed, the microscopic character and general structural features of the rocks which are exposed will be investigated and a thesis or dissertation embodying these results will be presented. Preparation required will depend upon the nature of the problems to be studied. Two terms (4).

Economic Geology.

PROFESSOR MILLER.

Advanced work in ore deposits. Study of the literature and of the theories of ore deposition, together with detailed work on the type occurrences of some one of the metallic or non-metallic minerals. The student will be required to make a thorough investigation and report on some mining district with special regard to the origin of the ores and such commercial aspects of the deposits as may depend chiefly on the geology. Preparation required: 271 or 273, also 274 and 279. Two terms (6).

Physiography.

PROFESSOR MILLER, MR. INGALSBE.

The detailed study of physiographic types and processes. Conferences, reports and theses, with work in the laboratory and field. A training in elementary physiography (such as is given in 277) together with some knowledge of general geology is essential. Two terms (4).

IN CIVIL ENGINEERING.

Bridge Design.

PROFESSOR MC KIBBEN.

The theory of suspension and arched structures, with the preparation of general plans and estimates, and the economic comparisons of different types. Two terms (4).

Testing of Materials.

PROFESSOR MC KIBBEN.

The properties of materials of construction, with special reference to inspection and testing. The student will conduct original researches in the laboratory. The work on the unification of methods of testing done by the International Association for Testing Materials will receive detailed attention. Two terms (5).

Railroad Engineering.

PROFESSOR WILSON.

The economic location of railroads, as influenced by probable volume of traffic and cost of operation. A course based on Wellington's treatise, with the detailed discussion of special cases. Two terms (2).

Sanitary Engineering.

PROFESSOR WILSON.

The designing of reservoirs, tanks, and pipe lines for water supply systems, and of sewers and other appurtenances for sewerage systems. Inspection of existing plants, with reports thereon. Two terms (4).

IN BIOLOGY.

Vertebrate Histogenesis and Organology.

ASSISTANT PROFESSOR HALL.

Lectures, reading, and laboratory work. In the laboratory the development of a vertebrate will be carefully followed, tracing the history of the germ-layers, organs, and tissues. The organology deals with the association of tissues to form organs. Preparation required: 292, 293, 294. First term (3).

IN PHILOSOPHY, PSYCHOLOGY AND EDUCATION.

Philosophy.

ASSISTANT PROFESSOR HUGHES.

The special study of any of the following philosophers: Aristotle, Spinosa, Leibniz, Hume, Kant, Hegel, Spencer, and James. First and second terms (5).

The philosophy of religion, involving the comparison of fundamental religious attitudes as manifested in the chief religious movements of ancient and modern times. First term (3).

The philosophy of history, based on Hegel's work. Second term (3).

The philosophy of education. An analysis of some important systems, ancient and modern. First and second terms (3).

UNDERGRADUATE COURSES.

The University offers the following four year courses:

I. In the School of General Literature:

1. The Classical Course.
2. The Latin-Scientific Course.

II. In the School of Technology:

1. The Course in Civil Engineering.
2. The Course in Mechanical Engineering.
3. The Course in Metallurgical Engineering.
4. The Course in Electrometallurgy.
5. The Course in Mining Engineering.
6. The Course in Electrical Engineering.
7. The Course in Chemistry.
8. The Course in Chemical Engineering.

These courses are described in detail on pages 82 to 119.

PHILOSOPHY, PSYCHOLOGY AND EDUCATION.

ASSISTANT PROFESSOR HUGHES.

Psychology.

1. Fundamental Processes. A survey of the central nerve system, and of the sense and motor organs. The analysis of perception and reasoning. Esthetic and moral judgments. Angell and Witmer. First term (2).

2. Genetic Psychology. The development in the individual of instinctive life into the higher activities of mind and body. Kirkpatrick, with outside reading. Second term (2).

3. Psychological Studies. The development in the individual and in the race of play and sport, of the different forms of art, and of the religious attitude. First term (2).

4. Psychological Studies, continued. The development of the moral consciousness. Abnormal conditions of mind. Second term (2).

5. Psychological Topics. Open to all students of the University. First and second terms (1).

6. Experimental Psychology. First and second terms (1 or more).

Philosophy.

7. History of Philosophy. Ancient, with special emphasis upon the Republic of Plato, and upon the Aristotelian system. First term (2).

8. History of Philosophy. Modern, with special emphasis upon Spinoza, Kant, Hegel, and upon the philosophies now current. Second term (2).

9. Scientific Method. A study of inductive and deductive logic, with considerable attention to the methods of statistical enquiry. Open to Sophomores, Juniors and Seniors. Second term (2).

Education.

10. Principles of Education. A study of the opinions prevailing among American teachers as to the aims and methods of instruction. For Juniors and Seniors. First term (2).

11. History of Education. A study of the theories that have prevailed in ancient and modern systems of education. Monroe's Text Book. Second term (2).

12. Principles and Practice of Teaching. Observation of lessons, and teaching in the practice school, with criticism and discussion of the lessons observed and given. (This practice school meets five evenings a week). First and second terms (2).

All courses in this department adopt the recitation method as far as is practicable, and require the preparation of one or more reports on specially assigned or selected topics. The reports are to be prepared in collaboration with the instructor.

ECONOMICS AND PUBLIC LAW.

PROFESSOR STEWART.

20. Economics. A study of the elementary principles of political economy. Lectures and required reading in selected works. First term. Required of students in School of General Literature (2), and of students in School of Technology (1).

21. Economics. Practical economic problems: taxation, transportation, finance, labor, trusts and monopolies. Second term. Required of students in School of General Literature (2), and of students in School of Technology (1).

22. Economics. Finance. Discussion of public expenditures; their nature, their relation to the industrial, political, and social conditions; their relation to the functions of government; also discussion of financial organization and administration. First term (2).

23. Economics. Finance. Discussion of public revenues; of revenue derived from the public domain and public industries; the apportionment, classification, and administration of taxes; the nature and employment of public credit; the origin and growth of public debts. Second term (2).

24. Economics. Elements of Business Law. The principles of contract; formation of contracts; operation and discharge of contracts; sales of goods; insurance contracts; negotiable instruments. First term. For students in School of General Literature (2); for students in School of Technology (1).

25. Economics. Elements of Business Law. Principal and agent; master and servant; business associations; partnerships and corporations. Second term. For students in School of General Literature (2); for students in School of Technology (1).

26. Public Law. Constitutional Law. Studies in Federal and State constitutional law. First term (2).

27. Public Law. Comparative Constitutional Law. Studies of the English, German and French governmental organizations. Second term (2).

28. Public Law. International Law. Its origin and sources; its authority and sanction; state sovereignty; territorial rights of sovereignty; naval or maritime belligerency; the Declaration of Paris. First term (2).

29. Public Law. International Law. The mitigation of war; the modern laws of war; rules as to prisoners and quarter; relations of belligerents on land; rights of capture by land; proposals to abolish war. Second term (2).

HISTORY.

PROFESSOR STEWART.

30. European History. The formation of the modern European nationalities with particular reference to the growth of France. The rise of the Universities. The Revival of Learning. The Reformation. The relations of Europe and America. Physiography, 277, is to be elected with this course. Second term (2).

31. EUROPEAN HISTORY. The history of modern Europe. The development of the power of Great Britain. The French Revolution and the history of the nineteenth century. First term (3).

32. UNITED STATES HISTORY. History of the United States since the adoption of the Federal Constitution. Economic progress of the country previous to 1860. The struggle over secession. Effects of the Civil War upon the economic and social life of the Union. The industrial expansion and its relation to changes of political policies. Second term (3).

LANGUAGES.

LATIN.

PROFESSOR BLAKE.

40. LIVY. Selections from Books I, XXI, and XXII. CICERO. De Senectute, and De Amicitia. Particular attention to forms and the usages of normal syntax. Writing of Latin prose exercises based upon the selections read. Written translations from Latin into English. History of the struggle between Rome and Carthage. First term (4).

41. HORACE. Odes and Epodes. Insistence upon tasteful translation. Constant practice in metrical reading. Memorizing of some of the odes of Horace. Writing of brief original dissertations on topics assigned in connection with Horace. Historical review of Roman lyric and elegiac poetry. Second term (4).

42. PLINY. Selected letters. TACITUS. Agricola and Germania. Consideration of social and legal usages suggested by Pliny. Some study of Roman provincial administration. First term (3).

43. PLAUTUS AND TERENCE. Careful study of a play of each, with rapid reading of as much more as the time permits. Study of dramatic verse-structure and practice in metrical reading. History of the drama at Rome. Second term (3).

44. HORACE. Selected Satires and Epistles, and Ars Poetica. Consideration of the philosophy and literary art of Horace. Second term (2).

45. TACITUS. Selections from the Histories or Annals. Some consideration of Tacitus as an historian and a literary artist. Sight-reading from SUETONIUS. First term (3).

46. JUVENAL. Selected Satires. Selections from MARTIAL. Satire and epigram in Roman literature. Study of social con-

ditions under the empire as evidenced by the writings of the younger Pliny, Tacitus, Suetonius, Juvenal, and Martial. Writing of brief dissertations on assigned topics. Second term (3).

47. LUCRETIUS. Careful study of one book entire of De Rerum Natura, with reading of selections from the other books. Consideration of textual questions. Discussion of ancient materialistic theories. Some review of Roman philosophy and ethics. First term (3).

48. ROMAN LAW. An elementary course. Selections from the Institutes of JUSTINIAN, or GAIUS, are read and commented on. Brief survey of Roman constitutional history and the development and content of the body of Roman Law, in connection with Morey's outlines of Roman Law. Second term (3).

GREEK.

PROFESSOR GOODWIN.

50. XENOPHON. Memorabilia, Cyropaedia, or Hellenica, LYSIAS, Orations. Review of the Grammar. Prose Composition. Sight-reading. Attic prose syntax is carefully studied, and special attention given to the formation of correct methods of study and translation, to grammatical analysis, and the reading aloud of Greek. One hour a week is devoted to composition and a variety of practical exercises. First term (4).

51. HERODOTUS. One book, with sight-reading. Grammar and Composition. Study of the forms and syntax of the Ionic Dialect. Practical exercises continued. Second term (4).

52. PLATO. Euthyphro and Apology, with other dialogues. Introduction to Greek Philosophy. Practical exercises, including composition, are given once in two weeks. First term (3).

53. EURIPIDES. Hecuba, Hippolytus, or Bacchae. Literary study of the drama. Poetical language, style, and conception. Metres. Composition. Second term (3).

54. THUCYDIDES. One book; or DEMOSTHENES. Selected Orations. Second term (2).

55. SOPHOCLES. Oedipus Tyrannus, Antigone, or Philoctetes. AESCHYLUS. Agamemnon, or Prometheus Bound. ARISTOTLE. Poetics. Literary study of the drama continued. Practice in metrical reading. Text-criticism. First term (3).

56. ARISTOPHANES. Clouds, Frogs, or Birds. Aristophanes as humorist and moralist, with consideration of the tendencies which he satirized. Second term (3).

57. HOMER. Considerable portions of the Iliad or Odyssey are rapidly read. Homeric language, syntax, and metre are reviewed, with some reference to the needs of intending teachers, but chiefly as a foundation for the study outlined in course 58. First term (3).

58. LYRIC POETRY. Fragments of the Elegiac, Iambic, and Melic Poets. Selections from PINDAR, or THEOCRITUS. Study of the development of poetry in Greece. Second term (3).

59. HELLENISTIC GREEK. New Testament. Selections from LUCIAN. To be substituted on occasion for 58. Second term (3).

FRENCH.

PROFESSOR PALMER, DR. FOX, DR. WOODS.

70. ELEMENTARY FRENCH. Fraser and Squair's French Grammar. Easy French texts. First term (3).

71. ELEMENTARY FRENCH, continued. Grammar and Composition. Dictation. Reading of short stories by various authors. Second term (3) or (2).

72. FRENCH. More advanced work in the Grammar. French Prose Composition. Readings from French history. Selections from Dumas. First term (2).

73. FRENCH. Continuation of course 72. Composition. Readings from modern French authors. Scientific French. Second term (2).

74. FRENCH. Brief review of the Grammar. Composition based on work in the Grammar. Reading of deVigny's Le Cachet Rouge; About's Le Roi des Montagnes; George Sand's La Mare au Diable. Dictation. First term (3).

75. FRENCH. Continuation of course 74. Composition. Reading of more difficult selections from modern authors and from the French Classic Literature. Second term (3).

76. FRENCH. French Prose and Poetry. Coppée, Maupassant, Zola, Daudet, Rostand. Composition. First term (3).

77. FRENCH. deVigny, Victor Hugo, Alfred de Musset, Balzac, George Sand. Lectures, reading and composition. Second term (3).

78. FRENCH. General view of French literature. Corneille, Racine, Molière, Beaumarchais, Lamartine, Victor Hugo, etc. Lectures, composition and reading. First and second terms (3). Courses 76-77 and course 78 are given in alternate years.

79. FRENCH. Lectures on 19th century French literature with collateral reading. First and second terms (3).

80. FRENCH. Lectures on 18th century French literature with collateral reading. First and second terms (3).

81. FRENCH. Lectures on 17th century French literature, with special attention to Corneille, Racine and Molière. Collateral reading. Second term (3).

82. FRENCH. Old French. Historical grammar. Bartsch's Chrestomathie de l'ancien français, VII-XV Siècle. First term (3).

83. FRENCH. Lectures on French literature from the earliest times to the beginning of the 17th century. Collateral reading. Second term (3).

GERMAN.

PROFESSOR PALMER, DR. FOX, DR. WOODS, MR. MAWHINNEY.

90. ELEMENTARY GERMAN. German Grammar and Composition. Easy German texts. First term (3).

91. ELEMENTARY GERMAN, continued. Composition based on work in the Grammar. Dictation. Reading of short stories by various modern authors. Second term (3) or (2).

92. GERMAN. More advanced work in the Grammar. Easy composition. Reading of more difficult German prose. First term (2).

93. GERMAN. Continuation of course 92. Composition and Dictation. Rapid reading of selections from German History, Freytag's Aus dem Jahrhundert des Grossen Krieges, and works of like difficulty. Second term (2).

94. GERMAN. Brief review of German grammar. Prose Composition. Reading of selections from Heyse, Baumbach, Wildenbruch, etc. First term (3).

95. GERMAN. Continuation of course 94. Advanced composition. Rapid reading of modern German Prose. Scientific German. Second term (3).

96. GERMAN. German Prose and Poetry. Heine, Keller, C. F. Meyer, Freytag, Storm, Heyse. Composition and lectures. First term (3).

97. GERMAN. Goethe. Gedichte, Egmont, Iphigenie, Tasso, Faust: Erster Teil. Lectures and composition. Second term (3).

98. GERMAN. General view of German literature. Lectures and rapid reading. Composition. First and second terms (3).

Courses 96-97 and course 98 are given in alternate years.

99. GERMAN. Nineteenth century German literature. Lectures, reading, reports on assigned work. First and second terms (3).

100. GERMAN. Lessing, Schiller, Goethe and Heine. Lectures, reading and reports in German on assigned work. First and second terms (3).

101. GERMAN. Lectures on German literature of the 16th and 17th centuries. Collateral reading. Second term (3).

102. GERMAN. Middle High German. Wright's Middle High German Primer. Bachmann's Mittelhochdeutsches Lesebuch. Nibelungenlied. First term (3).

103. GERMAN. Middle High German. Gudrun, Wolfram von Eschenbach, Gottfried von Strassburg, Walther von der Vogelweide. Lectures on Middle High German literature. Second term (3).

SPANISH.

DR. FOX.

110. SPANISH. Conversational Spanish. Hills and Ford's Spanish Grammar. Reading of easy modern texts. First and second terms (2).

Course 110 is open to Juniors and Seniors in the technical courses. The number of students accepted is limited as the sections are necessarily small.

111. SPANISH. Grammar, reading and composition. Modern Spanish novels and plays. First term (3).

112. SPANISH. Continuation of course 111. Reading and composition. Short outline of Spanish literature. Second term (3).

Courses 111 and 112 are open to all students of the University.

ENGLISH.

PROFESSOR THAYER, ASSISTANT PROFESSOR LUCH, MR. MESCHTER.

120. Rhetoric. A composition course based on Genung's Working Principles of Rhetoric, involving recitations and weekly themes on assigned subjects. First term (2).

121. American Literature. Lectures on the basis of Trent's History of American Literature. Text-book to be read by the student in sections as assigned. The examination is based upon the text-book and the student's note-book. First term (1).

122. History of the English Language. Lectures and class-room work, with the use of Lounsbury's History of the English Language as a text-book, supplemented by Emerson's and Champney's. Second term (2).

123. English Literature. An outline course developed by lectures and recitations, with parallel readings assigned annually. Text-book: Pancoast's English Literature (revised). First term (2).

124. Literary Criticism. The subject varies annually between topics taken from Elizabethan Literature, lyric or dramatic, and from XIXth Century Literature, earlier or later period. Second term (2).

125. Essays, on subjects annually assigned, taken from American authors and requiring the previous reading of some specific work. Six essays a year meet this requirement.

126. Essays, on subjects based on English Literature. Six essays a year meet this requirement.

127. English Literature of the 19th Century, the periods 1798-1830 and 1830-1900 being given in alternate years. A lecture course based on Saintsbury's XIXth Century Literature. First term (1).

128. Oratory. A formal course based upon Baker's Principles of Argumentation and Specimens of Argumentation, with recitations and writing of Briefs. One term (1).

129. Anglo-Saxon. Sweet's Anglo-Saxon Primer and Reader, with lectures on early English Literature, and readings from Brooke and Earle. First term (3).

130. English Philology. The principles of the Philology of the English language as developed in the works of Earle, Trench, Morris and Skeat. By a process of elimination the elements derived from Romance and other sources are excluded, and the residuum examined, in vocabulary and grammar, as a Teutonic language; with special reference to the intensive development of the tongue previous to the Age of Chaucer. Preparation required: 129. Second term (3).

131. Middle English. A critical study of the English of Chaucer, Langland, Wiclif, and Gower; followed by the literary study of selected specimens of their works. As text-books, The Student's Chaucer (Clarendon Press), Skeat's edition of The Vision of Piers the Plowman, Wiclif's translation of the New Testament revised by Purvey, and Gower's Confessio Amantis are assigned. First term (3).

132. Poetics. A course based on Gummere's Handbook of Poetics, Alden's English Verse, Saintbury's Loci Critici, and the use of Palgrave's Golden Treasury, and The Oxford Book of English Verse, with practical exercises in verse-composition. Second term (3).

133. To Seniors who wish to carry their linguistic work a little further, into the field of Teutonic philology, a course, alternative with 132, is offered, based upon Wright's Gothic Primer and Sweet's Icelandic Primer. Preparation required: 129, 130. Second term (3).

134. Optional courses on the Rise and Development of the English Novel and on the Arthurian Cycle are offered in alternate years. These are both lecture courses, with private reading assigned; and, if supplemented by a rigid examination, will be taken as equivalent to one term's work in any class above the grade of Freshman.

PUBLIC SPEAKING.

MR. EMERY.

139. Public Speaking. Original orations on topics of general interest, and discussion of engineering problems by technical students. First term (1).

MATHEMATICS AND ASTRONOMY.

PROFESSOR THORNBURG,
PROFESSOR MEAKER, PROFESSOR LAMBERT,
ASSISTANT PROFESSOR OGBURN, DR. MILLER, MR. STOCKER, MR. LOCKNER, MR. REYNOLDS.

140. Solid Geometry, beginning with Book VII and completing the subject. First term (2).

141. Trigonometry. Plane and Spherical Trigonometry, including the use of logarithmic tables. Preparation required: 140. First term (2).

142. Elementary Mechanics. Statics and dynamics with solutions of numerous illustrative and practical problems. First term (4). Second term (5).

143. Mensuration. The application of the principles of elementary Mathematics to the determination of lengths, areas, surfaces, and volumes: methods of, and practices in computation. First term (2).

144. Trigonometry. Spherical Trigonometry, including the use of logarithmic tables. First term (1).

145. Advanced Algebra, beginning with Permutations and Combinations and completing the subject. First term (2).

146. Analytic Geometry and Calculus. Graphic representation of loci on cross-section paper, plane and solid analytic geometry. Preparation required: 141 or 145. First term (6) or (5).

147. Differential and Integral Calculus. Embracing applications to analytic geometry problems, theory of center of gravity, moment of inertia, together with a short chapter on elementary ordinary differential equations. Preparation required: 146. Second term (6) or (5).

148. Analytic Mechanics. Differential equations of motion, treatment of forces in space, free and constrained motion of a particle and of masses, with applications to practical problems. Preparation required: 147. First or second term (2).

149. Descriptive Astronomy. A study of the fundamental facts and principles of the subject with solution of problems; observatory visits. Preparation required: 147 or 146 and 320. Second term (3).

150. Practical Astronomy. Study of instruments used, methods of taking and reducing observations to determine time, latitude, longitude, and azimuth; observatory work in which each student makes his own observations and computations in illustration of the problems studied. As this study is primarily for civil engineers, the sextant and engineer's transit are the chief instruments employed in the observational work. Preparation required: 147, 149. First term (3).

FREEHAND DRAWING.

MR. GELHAAR.

155. Freehand Drawing, with special reference to perspective, construction, and machine parts. First term (1).

CIVIL ENGINEERING.

PROFESSOR MCKIBBEN, PROFESSOR WILSON,
MR. CONKLING, MR. BECKER, MR. CONRAD, MR. WILLIS.

161. Descriptive Geometry. The use of instruments. Tracing and lettering. The descriptive geometry of projections, intersections, and developments. Plans, elevations and sections of simple structural details. Preparation required: 155. Second term (3).

162. Stereotomy. Problems in stone cutting, including plans for piers, culverts, aud arches. Isometric drawings and linear perspective. Preparation required: 161. First term (4).

163. Land Surveying. The theory and computation of areas, dividing land, and determining heights and distances. Map drawing and topographic signs. Field work with the level and transit in the determination of heights and distances, and in making surveys of farms. Map drawing from the student's field notes. Preparation required: 144, 161. Second term (4); also in Summer term, four weeks beginning June 11, 1908.

164. Topographic Surveying. The theory and use of the plane table, and of the transit and stadia. Pen topography. Detailed field work in rough country, and the construction of topographic contour maps. Leveling and triangulation. The adjustment of instruments with the investigation of their systematic errors. Preparation required: 163. Summer term, four weeks, beginning June 11, 1908.

165. Railroad Surveying. Reconnaissance, preliminary and location methods, with the theory of curves and turnouts. Location of a line, with the preparation of profiles and maps. The computation of earthwork and estimates of cost. Preparation required: 161, 163. Second term (5).

166. Geodetic Surveying. Elements of the method of least squares and the application to the adjustment of triangulations. The figure of the earth. Field work in triangulation, in determination of azimuth, and with the plane table. Preparation required: 147, 149, 164. First term (3).

167. Construction. Materials used in road making. The construction of roads, streets, and pavements with the methods for their drainage and repair. Preparation required: 155, 161. First term (2).

168. Construction. Stone and brick masonry, masonry structures. Foundations with piles, cribs, cofferdams, and caissons. Preparation required: 167. Second term (2).

169. Railroads. The construction of the roadbed; including ballast, crossties, rails, switches, culverts, and other details. Maintenance of way, and the elements of railroad operation. Visits of inspection, with written reports. Preparation required: 163, 168, 180. First term (2).

170. Cement and Concrete. The manufacture, properties, and testing of hydraulic cement, mortar, and concrete. Each student makes all the standard tests in the cement laboratory. Concrete buildings and structures; reinforced concrete. A fee of $1 is required for the laboratory work. Preparation required: 168. First term (2).

171. Strength of Materials. The elasticity and strength of timber, brick, stone, and metals. Theory of beams, columns, and shafts, with the solution of many practical problems. Each student makes fourteen experiments in the testing laboratory, which is equipped with 20,000, 100,000 and 150,000-pound machines for tension, compression, and flexure, a 50,000-inch-pound machine for torsion and other apparatus for special work. Preparation required: 142, 147. A fee of $1 is required for the laboratory work. First term (4).

172. Graphic Statics. Analysis of the stresses in roof trusses by the force polygon. Applications of the equilibrium polygon to the discussion of beams and girders. Preparation required: 142, 161. First term (2).

173. Graphic Statics. Analysis of the stresses in roof trusses by the force polygon. Applications of the equilibrium polygon to simple cases. Analysis of stresses in bridge trusses under dead loads. Retaining walls and masonry arches. Preparation required: 142, 161. First term (4).

174. Roofs and Bridges. The theory and computation of stress in roof and bridge trusses under dead, live and wind loads. Locomotive wheel loads on plate girders and bridge trusses. Preparation required: 171, 172. Second term (3).

175. Hydraulics. Hydrostatics and theoretical hydraulics. The flow of water through orifices, weirs, tubes, pipes, and channels. Naval hydromechanics. Hydraulic motors. Preparation required: 142, 147. Second term (3).

176. Bridge Design. The design of bridge floors and trusses. Sketches of details of bridges in the vicinity. Computations and working drawings are made from specifications for a railroad bridge of short span and estimates of its weight are prepared. Preparation required: 171, 174. First term (6).

177. Steel Buildings. Design of roof trusses and three-hinged arches. Mill building construction. Preparation required: 171, 174. Second term (2).

178. Bridges and Dams. Higher structures, including continuous, draw, cantilever, and suspension bridges, also metallic arches. The theory and design of masonry walls, dams, and arches. Reinforced concrete beams and arches. Preparation required: 171, 173, 174. Second term (4).

179. Sanitary Engineering. Systems of water supply, including purification systems, reservoirs, pipe lines, and pumping plants. Systems of sewerage and methods of sewage purification. House drainage. Preparation required: 175. First term (4).

180. Engineering Inspection. During the vacation between the Sophomore and Junior years each student in civil engineering is required to inspect some engineering work and prepare a report thereon. A brief description of the work or structure that the student desires to inspect must be presented to the Professor of Civil Engineering before July 15, and after approval, the report thereon must be submitted before September 16. These reports will contain such drawings, photographs, and computations as each case may demand, and their length will usually be from twenty to thirty pages of letter paper.

181. Thesis for Degree of C.E. Candidates for the degree of Civil Engineer select the subjects of their theses in the first term of the Senior year. Advice is given in regard to the plan of work, and references to literature are indicated. Reports concerning the progress of the investigation are made at intervals during the second term. The thesis is regarded as a part of the final examinations of the course.

SUMMER SCHOOLS IN CIVIL ENGINEERING.

Surveying. Exercises in Land Surveying and Topographic Surveying, designed primarily for students of the University, but open to all persons prepared to take them, are given in the Summer vacation. In 1908, this work begins at 8 A. M. on June 11 and ends on July 8.

The work of Land Surveying is described under No. 163, on page 53. Students in Mining Engineering are required to take this work at the close of the Freshman year. The fee for other persons is $20.

The work in Topographic Surveying is described under No. 164, on page 53. Students in Civil Engineering are required to take this subject at the end of the Junior year; Mining Engineering students at the end of the Sophomore year. The fee for other persons is $20.

Strength of Materials. Twenty-four exercises in the class-room and six in the testing laboratory will be given in 1908, beginning at 9 A. M. on August 14 and ending on September 11. As this work is a rapid review of the subject described under No. 171 it can be taken only by those who study during July and August under instructions which must be obtained from the Professor of Civil Engineering prior to June 6, 1908. This is an optional course and it will not be given unless the number of qualified applicants is at least five. The fee is $25.

Hydraulics. Twenty-two exercises in the class-room will be given in 1908, beginning at 11 A. M. on August 17 and ending on September 10. As this work is a rapid review of the subject described under No. 175, it can be taken only by those who study during July and August under instructions which must be obtained from the Professor of Civil Engineering prior to June 6, 1908. This is an optional course and it will not be given unless the number of qualified applicants is at least five. The fee is $20.

INSPECTION REPORT. Inspection of engineering work and a report thereon is required of all students in civil engineering during the vacation following the Sophomore year. This is described under No. 180, on page 55.

MECHANICAL ENGINEERING.

PROFESSOR KLEIN,
PROFESSOR HECK, PROFESSOR DE SCHWEINITZ,
MR. KLEIN, MR. JONES.

200. DRAWING AND ELEMENTS OF MACHINE DESIGN. Tracings and blue prints. Sketches and working drawings of machine pieces. Interpretation of machine drawing by isometric sketches. General view from given details. Sections of stub ends and valve passages. Intersection of boiler flues. Empirical proportioning of machine parts. First term (3).

201. CONSTRUCTIVE ELEMENTS OF MACHINERY. Visits of inspection. Examination and sketching of machine parts and machinery. A classified and numbered list of some three hundred and sixty items is given to each student, who makes a written report on them with freehand sketches containing the leading dimensions. The class is divided into sections, which are separately taken into the shops by the instructor, who then indicates the pieces that are to be examined and gives all necessary explanations. In addition a score of machines of all sorts are taken apart and again put together by this class. This work is accompanied by Constructive Elements of Electrical Apparatus, No. 350. For further details see special circulars of the M.E. and E.E. departments. Summer term, four weeks, beginning June 11, 1908.

202. ELEMENTS OF MACHINE DESIGN. Proportioning of such machine parts as come under the head of fastenings, bearings, rotating and sliding pieces, belt and toothed gearing, levers, and connecting rods. Second term (3).

203. BOILERS. Description of various types, and of details of construction, staying, setting, etc.; strength of the structure; accessories; fuels and furnaces; operation; wear and tear; visits of inspection to a boiler shop and to a boiler plant. Text-book; Peabody and Miller. First term (1).

204. Steam Engine. Elementary Thermodynamics, theory of the ideal heat engine, properties of steam and efficiency of the steam engine. Mechanics of the engine, steam pressures, inertia resistances, turning force diagrams, etc. Valve gears, valve diagrams applied to slide valves, shaft governors, and link motion. The steam engine indicator and study of diagrams. Outline of the study of economy, compounding, etc. The descriptive work is supplemented by shop visits. The solution of many graphical and numerical problems is required. Text-book: Heck's Steam Engine. Second term (4).

205. Steam Engine. Shorter course. Second term (3).

206. Mechanical Technology. Each student is required to give a full written description of the various processes, operations, and tools involved in the production of each one of a series of properly graded examples of patterns, castings, forgings, and finished pieces, which are under construction in the shops at the time and drawings for which have been given to him on entering the shops. The student's work is personally directed by an instructor, who accompanies him in each shop, gives necessary explanations, and tests the extent and accuracy of his knowledge. Four teachers are engaged in this work, one for each shop and section. Summer term, four weeks, beginning June 11, 1908.

207. Mechanics of Machinery. Graphical statics of mechanisms. Determination of the efficiency of a machine and of the forces acting in every one of its pieces and parts. All the problems are given to the students in the form of black prints and consist of a series of suitably graded examples of machinery. In these both frictional and inertia resistances are considered. First term (2).

208. Engineering Laboratory. Use and calibration of apparatus for measuring weight, volume, pressure, temperature, speed, etc., for engineering purposes. First term (2).

209. Engineering Laboratory. Work of 208 continued. Indicator practice, on engines in the laboratory and in factories and power plants in the neighborhood; complete working up of indicator diagrams from simple and compound engines, air compressors, etc. Second term (1).

211. Mechanics of Machinery. Machinery of Transmission. Weisbach-Herrmann series: Vol. III, Part I, Section I. This treats of the Mechanics of Machine Parts and determines their

dimensions from considerations of strength and durability. The Introduction is also studied for its excellent analytical presentation of the subject of acceleration. Second term (3).

212. Summer School in Engineering Laboratory. Simple tests with steam: steam calorimeters, injectors, flow of steam, performance of steam-traps, etc.; tests of small steam pumps, of a steam turbine, of engine performance; of hot-air and gas engines, and of an air compressor. Boiler management and testing. Dynamometer work, belt testing, friction and lubrication. Summer term, four weeks, beginning June 11, 1908.

216. Thermodynamics. Proof of the fundamental laws; equations of condition for air and superheated steam; the relations between pressure, volume, temperature, work and heat for special changes of state. Establishment of the fundamental equations of thermodynamics and their adaptation to gases and vapors. Application of the results and of graphical methods to technical problems. Text-book: Zeuner's Technical Thermodynamics. First term (5).

217. Kinematics of Machinery. This treats of the constrained motion peculiar to machinery and of the nature and equivalence of mechanisms. As here pursued it consists of a few lectures accompanied by a large amount of work in the drafting room. The work is mainly expended on the construction of centrodes, on inversions and skeletons of mechanisms and also on the preparation of displacement, velocity and acceleration diagrams for a great variety of machines. This is followed by much practice in mass and force reductions, the latter including all forms of inertia resistance and external forces. First term (4).

218. Advanced Machine Design. This covers the design of machines in general, such as machine tools, hydraulic machinery including pumps, etc., hoists, cranes, etc. Each student is required to design several machines individually, to gain experience in designing and in proportioning the various parts for strength, stiffness and other requirements. First term (4).

220. Engineering Laboratory. Work of 209 and 212 continued. Tests of boilers, of power plants and of pumping stations in the neighborhood. Advanced work along the lines of 212. First term (1).

221. Engineering Laboratory. A shorter course, selected and condensed from 208 to 228 especially in steam engineering, for

students in Metallurgical, Mining, and Electrical Engineering, and Electrometallurgy. First term (1).

222. Engineering Laboratory. Work of 221 completed, along same lines. Second term (1).

224. Advanced Machine Design. This is a continuation of course 218, being more specialized. Second term (6).

226. Engineering Laboratory. Analysis of flue gases; complete tests of the power plants of the vicinity. Second term (1).

227. Mechanics of Machinery. Hoists, Pumps, Compressors, Blowing Engines, and Fans. The presentation is that of the Weisbach-Herrmann series. The class-room work is supplemented by suitably timed visits of inspection. Second term (4).

228. Engineering Laboratory. Work of 220 carried forward, along same lines. Second term (1).

229. Steam Turbines. The Mechanics, Thermodynamics, Construction and Experimental Results of the Steam Turbine. Textbook: Stodola. Second term (5).

230. Gas Engines. The Mechanics, Thermodynamics, Thermochemistry, Construction, and Tests of the Gas Engine. Textbook and reference-book: Hutton & Güldner. First term (3) or (2).

231. Thesis for Degree of M.E. Candidates for the degree of Mechanical Engineer are required to present theses upon topics connected with mechanical engineering. Drawings and diagrams are required whenever the subjects discussed need such illustration.

For Summer Schools see courses 201 (connected with course 350), 206, and 212, also statement on page 80.

IN MINERALOGY.

PROFESSOR RICHARDS,

ASSISTANT PROFESSOR LANDIS, MR. BURKHART, MR. BUCH.

240. Crystallography. Elementary course in Geometric Crystallography, with practical exercises in the determination of crystalline forms in models and actual crystals. First term (2).

241. Mineralogy. Elementary course in physical, chemical, and descriptive Mineralogy, with practical exercises in the determination of about two hundred of the more common mineral species. Text-book: E. S. Dana's Text-book of Mineralogy. Second term (3).

242. Mineralogy. Shorter course. Second term (2).

(A deposit of $5 is required from each student taking courses 240 and 241, or 240 and 242, to cover damage to collections and instruments and the value of supplies furnished him. In case the damage consists only of ordinary wear and tear the amount retained to cover it will not exceed $2 for each student.)

243. Blowpipe Analysis. An elementary course in blowpipe analysis considered as a method of qualitative chemical analysis. Illustrated lectures followed by practical testing for thirty-five bases and fifteen acids. Reference book: Plattner's Blowpipe Analysis, latest English edition. Second term (1).

244. Blowpipe Analysis. Advanced blowpipe tests and separations. The application of blowpipe methods as primary tests in determinative mineralogy. Reference book: Plattner's Blowpipe Analysis, latest English edition. First term (1).

245. Blowpipe Analysis. Laboratory work in quantitative blowpipe analysis, dealing particularly with the determination of gold, silver, cobalt, nickel, copper, lead, tin, bismuth, mercury, and analysis of coal. Reference book: Plattner's Blowpipe Analysis, latest English edition. First term (1).

(In each of the Blowpipe courses a deposit of $2 is required, of which, on an average, $1 is retained to cover cost of gas, chemicals, and specimens supplied.)

IN METALLURGY.

PROFESSOR RICHARDS,
ASSISTANT PROFESSOR LANDIS, MR. BURKHART, MR. BUCH.

250. Drawing and Metallurgical Construction. Tracing and blue prints. Sketches and working drawings of machine pieces. Interpretation of drawings by isometric sketches. General views from given details. Sections of simple construction. Intersections of spheres, cones, cylinders, etc., accompanying the study of descriptive geometry and illustrated from examples of mining

and metallurgical plant. Flat tinting with water colors. First term (4).

251. Metallurgical Construction and Drawing. Examination and sketching of metallurgical plant in the vicinity. General views and working drawings of the plant examined, accompanied by written descriptions of its construction and operation. Second term (3). For students in Course of Mining Engineering. First term (3).

252. Metallurgical Design. Execution of designs accompanied by working drawings and estimates of material and cost for the erection of metallurgical plant under given conditions. Second term (2).

253. General Metallurgy, Metallurgy of Iron. Problems. General Metallurgy: Metallurgical processes. Transmission of heat. Measurement of high temperatures. Furnaces. Fluxing. Fireproof materials. Principles of thermal chemistry. Combustion. Properties of natural and artificial fuels. Manufacture of gaseous fuels. The Siemens Furnace. Charcoal burning. Coking. The electric furnace. Reference books: Schnabel's Allgemeine Hüttenkunde, Roberts-Austen's Introduction to the Study of Metallurgy.

Metallurgy of Iron: Chemical and physical properties of iron. Iron ores. Preparation of ores. The blast furnace. Remelting in the foundry. Pig washing. Puddling. The Bessemer process. The open hearth process. Cementation. Manufacture of crucible steel. Electric steel. Direct processes. Methods of casting and forging. Reference books: Ledebur's Eisenhüttenkunde, Stoughton's Metallurgy of Iron.

Metallurgical Problems: A course of fifteen problems embodying the use of the physical, chemical and mechanical principles utilized in practical metallurgy. Reference: Richards' Metallurgical Calculations, Parts I and II. Second term (5).

254. General Metallurgy, Metallurgy of Iron, Steel and other Metals, Problems. Shorter course. Reference books: Phillips-Bauerman's Elements of Metallurgy, Richards' Metallurgical Calculations. Second term (3).

255. Metallurgy of Copper, Lead, Silver, Gold, Zinc, Tin, Mercury, Nickel, Aluminum, etc. Copper: Chemical and physical properties. Ores. Smelting sulphide ores. The Bessemer process. Treatment of oxide ores. Wet processes. Electrolytic processes.

Lead: Chemical and physical properties. Ores. Smelting processes. Condensation of lead fume. Refining and desilverization of base bullion. Silver: Chemical and physical properties. Ores. Smelting with lead. Amalgamation. Leaching processes. Gold: Chemical and physical properties. Ores. Gold washing. Gold milling. Chlorination. The cyanide process. Parting gold and silver. Zinc: Chemical and physical properties. Ores. Belgian and Silesian processes for the manufacture of spelter. Manufacture of zinc oxide. Electrolytic processes. Mercury: Chemical and physical properties. Ores. Processes of extraction. Aluminum: Chemical and physical properties. Ores. Extraction by electrolysis. Tin, Nickel, Platinum, Antimony, etc.: Chemical and physical properties; Ores; Alloys; Processes of Extraction. Reference books: Schnabel's Handbook of Metallurgy, Richards' Metallurgical Calculations, Part III. First term (4).

256. Metallurgical Laboratory. Calibration and use of pyrometers and calorimeters. Determination of melting and freezing points of metals and other metallurgical products. Study of cooling curves. Deposit, $10. Reference book: Howe's Metallurgical Laboratory Notes. Second term (1).

257. Theory of Electrolysis. Lectures discussing the phenomena of electrolysis and the various theories proposed to account for them. Special consideration of secondary reactions, and also of the quantitative relations between electrical and chemical energy, and their mutual convertibility. Reference book: Le Blanc's Text-book of Electro-Chemistry (translated by Whitney and Brown). First term (1).

258. Electrometallurgy. Lectures discussing the practical applications of electricity to metallurgical processes. Electrolytic and electric furnace plants and practice. Reference books: Borcher's Electric Smelting and Refining, Neuburger's Handbuch der Praktischen Elektrometallurgie. Second term (1).

259. Electrometallurgical Laboratory. Quantitative separations and depositions of metals by electrolysis. Experimental determination of the conditions controlling the nature of electrolytic deposits. Electrolysis of salts. Cathodic Reduction. Deposit, $10. First and second terms (1).

(Extra courses in the reading of Technical German and French are offered during the second term by the staff of this Department.)

260. Thesis for Degree of Met.E. Every student in Metallurgical Engineering is required to present a thesis on some topic connected with this subject.

261. Thesis for Degree of El.Met. The theses required for this degree will be upon some subejct connected with the theory or practice of Electrometallurgy.

For Summer Schools see courses 201, 350, and 206, also statement on page 80.

GEOLOGY.

PROFESSOR MILLER, MR. INGALSBE.

270. Geology. Short course. A course in structural and dynamic Geology, including the subject of Lithology or the study of rocks without the microscope. Recitations and lectures illustrated by lantern views. Five field trips are given in connection with the work. This course is especially designed for students of civil engineering whose work is not concerned primarily with geology and who do not expect to prepare themselves for the courses in applied geology which follow. It is also recommended to students in the School of General Literature. Preparation required: 240, 241. First term (2).

271. Geology. Short course. A continuation of 270. Historical Geology. The classification of geologic time. Study of the types of life characteristic of the different periods, and the principles of organic evolution which they illustrate; a brief review of the geology of the United States and the physical changes which the country has undergone during its development. Five field trips are held as in the first term. Preparation required: 270. Second term (2).

272. Geology. Long course. Structural and dynamic Geology, including a thorough grounding in the study of rocks without the microscope. Lectures illustrated by lantern views; recitations. Essays on geological subjects are assigned to the men from time to time and five field trips are held in conjunction with the work. Each student is required to take detailed field notes on the geology of the region. This course is designed for those men who will pursue the technical courses in applied geology which follow in the Senior year. Preparation required: 240, 241. First term (3).

273. Geology. Long course. A continuation of 272. Historical Geology. The classification of geologic time. Study of the types of life characteristic of the different periods and the principles of organic evolution which they illustrate with a brief review of the geology of the United States and the physical changes which the country has undergone during its development. Five field trips are held in conjunction with the work, as in the first term. Preparation required: 272. Second term (2).

274. Economic Geology. Causes of the formation of cavities in rocks, their relation to metalliferous deposits; discussion of the theories of ore-deposition; the structure, geological horizon and geographic distribution of the principal metallic and non-metallic economic deposits of the United States. Recitations, illustrated lectures and laboratory work. Each student is required to prepare a series of plates illustrating the location, production, chemistry and geology of the economic products of the United States. Preparation required: 270 and 271, or 272 and 273. Second term (3).

275. Applied Palaeontology. A thorough grounding in the principles or stratigraphy; fossils, their classification and origin; laboratory practice in the determination of the geologic age of formations by the contained fossils. Visits to type localities for certain fossils are held in conjunction with this work. The origin, modes of deposition, physical characters, structure, occurrence and distribution of stratified rocks. Preparation required: 270 and 271, or 272 and 273. First term (2).

276. Geology of North America. The physiographic provinces of North America, their development and relation to one another; the geological age and geographical distribution of the rocks of which North America is composed; the structure and history of its mountain ranges, the formation of its great lakes and drainage systems; the history of its geological development and origin; reviews of the great surveys that have been made and their history. Lectures and laboratory work. Preparation required: 270 and 271, or 272 and 273. Second term (3).

277. Physiography. The cosmical relations of the earth; the classification of land forms; the study of their origin, growth and decay and the factors governing their development; their geographical distribution. Topographic maps; the relation of topography to geologic structure. The response of man and other

organic life to an inorganic environment with special reference to the influence of Physiography upon the economic development of a country. Preparation required: 270 or 272. Second term (3) or (2).

278. Field Geology. Geological maps; their use and the methods by which they are constructed. Practice in the actual working out of surface geology. Problems in plotting geology on topographic maps; each student will be assigned a definite area and will be required to make a geological map of it with structure sections. He will also collect a full set of specimens to illustrate the geology. The first part of the course will be devoted exclusively to field work and the notes then taken will be worked up in the laboratory when the weather prevents further out-of-door work. A fee of $1 for the use of instruments is charged to all students taking this course. Preparation required: 270 and 271 or 272 and 273. First term (2).

279. Petrology. The optical properties of minerals and their study with the petrographical microscope. Recitations and laboratory work. A laboratory fee of $3 to cover breakage is charged all students taking this course. Preparation required: 325, 326. First term (2).

280. Petrology. The determination of rocks by means of the petrographical microscope. This course is designed to aid in the study of those species of rocks which are too difficult to determine with the unassisted eye and to lead to a clearer understanding of the fundamental principles of the origin and classification of rocks. Lectures, recitations and laboratory work. Practice in preparation and mounting of thin sections. A laboratory fee of $3 to cover breakage is charged all students taking this course. Preparation required: 279. Second term (1).

281. Petrology. Advanced Course. Practical applications of petrographical work in the study of rocks. Preparation of thin sections. Collection of suites of specimens and study of the rocks collected. Recalculation of chemical analysis of rocks. Practical work in the preparation of micro-photographs and drawings of rocks. Second term (1).

BIOLOGY.

ASSISTANT PROFESSOR HALL, MR. GILMORE.

290. Botany. An elementary course treating of the structure and classification of plants. Lectures, laboratory work, and reference to text-books. Preparation advantageous: 292. Second term (2).

291. Plant Biology (Elements of Forestry). Recitations and lectures on the morphology, physiology, adaptation to environment, and classification of plants, especially trees; embodying the hygiene of forestry and shade trees and the characteristics of useful timber woods. Second term (1).

292. Biology. Lectures, recitations, and laboratory work. The lectures discuss the following topics: (*a*) fundamental conceptions; life, protoplasm, the cell, etc.; (*b*) the structure, development, relationships, habits, and geographic distribution of animals; (*c*) the more important biological theories; variation, heredity, evolution, etc. In the laboratory, types of the various phyla are dissected and drawings made. First term (3).

293. Comparative Anatomy of Vertebrates. Lectures on the comparative anatomy of vertebrates, with a more extended discussion of biological theories. The laboratory work consists of the dissection of types of the several vertebrate phyla. Preparation required: 292. Second term (3).

294. Vertebrate Embryology. Lectures, reading, and laboratory work. By the study of living, preserved, and sectioned material, the successive stages of cleavage, gastrulation, and the formation of organs are demonstrated. Preparation required: 293. First term (2).

295. Sanitary Biology. Lectures, recitations, assigned reading and laboratory work. Study of bacteria; microscopical appearance, methods of staining, plate and tube cultures, etc. The quantitative and qualitative bacteriological and microscopical examination of water. Second term (2).

296. Bacteriology. Recitations and laboratory work. After the general study of bacteria, special attention is paid, in this course, to those forms which are economically important, such as those of water, foods, dairy products, soils, etc. Preparation advantageous: 290 or 292. First term (2).

(A fee of $3 is required in courses 292, 295, and 296, to cover cost of material and breakage.)

DR. ESTES.

299. Hygiene. This is a course of didactic lectures intended to teach the students some idea of the importance and the methods of personal hygiene and sanitary laws. It is also intended to suggest to young men who may become engineers, miners, and explorers the importance of and how to take proper measures for the sanitary comfort and personal well-being of men who may, in after life, be under their control and leadership.

MINING ENGINEERING.

PROFESSOR ECKFELDT, MR. DANIELS.

300. Prospecting. Modes of occurrence of minerals. Uses of Geology. Prospecting for placer, lode and bedded deposits. Magnetic prospecting. Preliminary boring. Sampling. Valuation of property. Location of claims. Patents to mining ground. Preparation required: 270 or 272. Second term (1).

301. Boring. Uses of bore holes. Methods: by rotation; by percussion with rods and ropes. Special methods: shaft sinking by boring. Survey of bore holes. Preparation required: 270 or 272. Second term (1).

302. Mining. Location of plant; breaking ground; tools and machines. Explosives; laws; blasting. Shaft and slope sinking. Tunneling. Supporting excavations; timber, metal, masonry. Development of deposits. Systems of mining underground and at the surface. Preparation required: 270 or 272. Second term (2).

303. Transportation. Hoisting: Motors, ropes, and attachments. Receptacles. Safety appliances. Laws. Systems of hoisting. Haulage. Surface and underground. Motors, vehicles. Systems: wire rope; aerial tramways. Loading and unloading; stocking and storage of minerals. Transportation of workmen. Signaling. Preparation required: 142. First term (1).

304. Drainage. Surface water. Prevention of access. Dams. Drainage by tunnels. Mechanical drainage; hoisting water; pumping. Classes of pumps. Classes and positions of motors. Preparation required: 142, 175. First term (1).

305. Ventilation and Lighting. Atmosphere of mines. Pollution. Natural and artificial ventilation. Systems. Classes and

efficiencies of ventilators. Testing air. Instruments. Laws. Lighting. Methods. Dangers. Laws. Safety-lamps. Lighting by electricity. Preparation required: 320, 322, 325, 390. First term (1).

306. Accidents. Classes. Causes. Means of prevention. Rescue. Hygiene of mines; rules and laws. First aid to injured. Preparation required: 299. First term (1).

307. Mine Constructions. The use of stone, brick, cement, concrete, metal and timber with special reference to mining plant. Foundations, piling, dams, reservoirs, retaining walls, mine buildings, railroads, trestles, tipples, ore-bins and docks. Preparation required: all of preceding subjects. First term (2).

308. Mine Administration. Management, organization, employment of labor, mine accounts, etc. Preparation required: all of preceding subjects. Second term (1).

309. Dressing. Theory of ore dressing. Physical principles involved. Machines used in wet, dry, and magnetic methods; order of arrangement. Processes. Location of works. Preparation of coal. Preparation required: 241 or 242. First term (3).

310. Mine Surveying; Railroad Surveying. Instruments. Forms of notes. Outside work. Determination of meridian. Inside work. Connecting outside and inside work through shafts, slopes, or tunnels. Calculation of notes; mapping. Railroad Surveying: preliminary and location methods; theory of curves, turnouts, etc. Care of maps. Detection of errors. Special problems. Preparation required: 163, 164. Summer term at the end of Junior year, four weeks, beginning June 11, 1908.

311. Mechanical Drawing. The use of instruments. Tracing and lettering. Descriptive Geometry; isometric and orthographic projections; intersections and developments of cylinders, cones, spheres, etc. Sketches and working drawings of machine parts. Blue printing. First term (3). Second term (1).

312. Drawing and Design. Continuation of 311. Designing of machine parts, such as bolts and nuts, screws, bearings, shafts, pulleys, gearing, etc. First term (2). Second term (3).

313. Mining Design. The design of parts of mining plant to meet given conditions, with detailed working drawings, accompanied by estimates of material and costs. Preparation required: 311, 312, 171, and mining subjects. Second term (4) or (2).

314. Thesis for Degree of E.M. Candidates are required to present a thesis on some topic connected with mining. With the approval of the Professor of Geology or of Metallurgy a subject may be taken from some topic in either of those departments.

For Summer Schools see courses 163, 164, and 310, also statement on page 80.

PHYSICS.

PROFESSOR FRANKLIN,
ASSISTANT PROFESSOR MACNUTT,
MR. WILY, MR. VEAZEY, DR. STEBBINS, MR. CHARLES.

320. Elementary Physics. Mechanics and Heat. Lectures, recitations, and problem work. Second term (2).

321. Elementary Physical Laboratory, accompanying 320. Second term (1).

322. Elementary Physics. Electricity and Magnetism. Lectures, recitations, and problem work. Preparation required: 320, 321. First term (3).

323. Elementary Physics. Mechanics, Heat, Electricity, and Magnetism. Lectures, recitations and problem work. This study is offered to students in the School of General Literature. First term (3).

324. Elementary Physical Laboratory, accompanying 322 and 323. First term (1).

325. Elementary Physics. Light and Sound. Lectures, recitations, and problem work. Preparation required: 322 or 323, and 324. Second term (3).

326. Elementary Physical Laboratory, accompanying 325. Second term (1).

327. Advanced Theory of Electricity and Magnetism. Electrical units, electrical measurements, inductance, the magnetism of iron, and electromagnetic theory. Lectures, recitations and problem work. Preparation required: 147 and 320 to 326, inclusive. First term (2).

328. Electrical Laboratory, accompanying 327. Precise electrical measurements. First term (1).

329. Electrical Laboratory. Continuation of 328. Precise electrical measurements. Second term (1).

330. Theory of Light. This study is based upon Preston's Theory of Light, supplemented by Drude's Lehrbuch der Optik and by the reading of monographs on optics. First term (5).

331. Theory of Heat. This study is based upon Clausius's Theory of Heat supplemented by the reading of monographs on Physical Chemistry. Second term (4).

332. Physical Laboratory. This course in laboratory work offered to special advanced students, consists of refined measurements in any branch of Physics at the option of the student. First term (2).

334. Electrical Laboratory, accompanying 257. Experimental studies in electrolysis. Measurements of resistances of electrolytes, applications of Faraday's laws of electrolysis, studies of electrolyte polarization, determinations of critical voltages of decomposition, tests of primary batteries and storage batteries, and tests of commercial types of electrolytic cells. First term (1).

357. Theory of Alternating Currents. A general survey of the elementary theory of alternating currents. Lectures, recitations, and problem work. Preparation required: 327, 328, 352. First term (2).

335. Theory of Alternating Currents. A general survey of the elementary theory of alternating currents. Lectures, recitations and problem work. Preparation required: 327, 328, 354. Second term (2).

360. Theory of Alternating Currents. Continuation of 357. Advanced theoretical studies of alternators, synchronous motors, and synchronous converters. Preparation required: 357, 361. Second term (2).

364. Theory of Alternating Currents. Continuation of 360. Advanced theoretical studies of transformers, induction motors, and transmission lines. Preparation required: 360. First term (3).

338. Advanced Electrical Measurements. Precise measurements of capacity and inductance, electrolytic measurements, tests of dielectric strength of insulators and conductivity tests of wires. First term (1).

Beginning with the second term, Freshman year, a deposit of $6 each term to cover breakage, wear and tear of apparatus,

appliances, etc., is required of each student. The unused balance of the deposit is returned to the student.

ELECTRICAL ENGINEERING.

PROFESSOR ESTY, MR. SEYFERT, MR. CLEWELL, MR. FOSTER.

350. CONSTRUCTIVE ELEMENTS OF ELECTRICAL APPARATUS. Studies of electrical machinery and appliances with the object of familiarizing the student with principles of operation, structural details, and practical uses. The student is supplied with a complete printed outline of the work to be done containing full instructions and explanations. The work consists of three parts, as follows: (*a*) Illustrated lectures, (*b*) Inspection and sketching of electrical machines and apparatus, and (*c*) Visits of inspection to neighboring electric light and power plants. Written reports are required on each day's work. Deposit, $3. This work is accompanied by Constructive Elements of Machinery, No. 201. Summer term, four weeks, beginning June 11, 1908.

351. ELECTRIC WIRING. Systems of direct current distribution; wiring formulas and applications; installation of electrical machinery and apparatus; interior wiring, overhead and underground construction; rules and regulations of the National Board of Fire Underwriters. Preparation required: 350. First term (1).

352. DYNAMOS AND MOTORS. Review of elementary electricity and magnetism with special reference to their application to the dynamo. The construction, operation and control of direct current machinery; practical operation and management of dynamo machines; station equipment; cost of electrical energy; electromagnets, magnetism of iron; characteristic curves; armature windings. Illustrative problems. Preparation required: 322, 324, 351. Second term (3).

353. DYNAMO LABORATORY. Introductory course supplementing the class work of 352. Experimental studies and tests of direct current generators, motors, and appliances, for characteristics, regulation, efficiency, insulation, etc. Deposit, $6. Preparation required: 322, 324. Second term (1).

354. DYNAMOS AND MOTORS. This is an abbreviated course adapted to those students who do not continue this subject in the following year. Special attention is given to the operation,

regulation, management and methods of testing of dynamos and motors. Illustrative problems. Preparation required, 322, 324. First term (2).

355. Dynamo Laboratory. Introductory course supplementing the class work of 354 or 371. Experimental studies and tests of direct current generators and motors for characteristics, regulation, efficiency, etc. Deposit $6. Preparation required: 322, 324. First term (1).

356. Dynamo Laboratory. Continuation of 355 and supplementing the class work of 362 or 378. Advanced testing of direct current machines; practice is given in operating and testing alternating current apparatus. Deposit $6. Preparation required: 355, 362 or 371. Second term (1).

357. Theory of Alternating Currents. Given in the department of Physics. A general survey of the elementary theory of alternating currents. Lectures, recitations and problem work. Preparation required: 322, 324, 352. First term (2).

358. Dynamo-Electric Machinery. Continuation of 352. Advanced study of dynamo and motor characteristics, theory of regulation, armature windings, armature reactions; illustrative problems. Preparation required: 352. First term (2).

359. Dynamo Laboratory. Continuation of 353. Advanced testing of direct current machines. Deposit $6. Preparation required: 352, 353. First term (1).

360. Theory of Alternating Currents. Given in the department of Physics. Continuation of 357. Advanced theoretical studies of alternators, synchronous motors, and synchronous converters. Preparation required: 357, 358. Second term (2).

361. Electrical Engineering. Continuation of 358. General survey of the more important industrial applications of electricity. Systems of generation, distribution, and transmission by direct and alternating currents; feeder regulation, alternating current wiring; arc and incandescent lamps; meters and metering; photometry; electric lighting. Preparation required: 327, 357, 358. Second term (1).

362. Electrical Engineering. Continuation of 354. Similar in general scope to 361 but particularly adapted to students who do not further specialize along the technical lines therein outlined. Special attention is given to outside and interior wiring; overhead and underground line construction. The latter part of this

study is devoted to the standard types of alternating current machines, including alternators, motors, rotary converters and transformers, being supplementary to 335. Preparation required: 327, 354. Second term (2).

363. Dynamo Laboratory. Continuation of 359. Advanced testing of direct current machines. Deposit $6. Preparation required: 357, 359. Second term (1).

364. Theory of Alternating Currents. Given in the department of Physics. Continuation of 360. Advanced theoretical studies of transformers, induction motors, and transmission lines. Preparation required: 360, 361. First term (3).

365. Alternating Current Machinery. Study of the structural details, characteristics and operation of alternators, alternating current motors, rotary converters, and transformers; illustrative problems. Preparation required: 360, 361. First term (3).

366. Dynamo Testing. Lectures on the methods of testing electrical machinery and apparatus, including direct current generators, motors, and motor-generator sets. Special methods of testing large machines; commercial tests as carried out by the large manufacturing companies. Preparation required: 327, 359. Second term (1).

366A. Dynamo Testing. Continuation of 366. Lectures on testing of alternating current machinery and apparatus including generators, motors, rotary converters, transformers, induction regulators, etc. Preparation required: 360, 366. First term (1).

367. Dynamo Laboratory. Experimental studies and tests of alternating current generators and motors, synchronous converters, transformers, and auxiliary apparatus; measurement of power in polyphase circuits. Deposit $12. Preparation required: 360, 361, 363. First term (2).

368. Electrical Design. Calculations of electromagnetic mechanisms and direct current dynamo-electric machinery; a graded series of problems leading up to original designing; drafting. Preparation required: 360, 361, 363. First term (2).

369. Electric Stations. Consideration of prime movers; generating machinery, discussion of types and operation; auxiliary machinery and transformers; storage batteries and their application; switch-boards, measuring and protective devices; design and arrangement; station characteristics; sub-stations; opera-

tion and management; visits to neighboring plants. Preparation required: 335 or 360, 361 or 362. First term (2).

370. Electrical Engineering Seminary. A weekly meeting is held in the department reading room for discussion of topics from the current journals of theoretical and applied electricity. Presentation of papers on assigned topics; new inventions and discoveries critically reviewed. Preparation required: 361 or 362. First term (1).

371. Electrotechnology. Review of the principles of electricity and magnetism, with special reference to their application to dynamo electric machinery; the elementary theory of direct current generators and motors; ratings and guarantees; practical operation of dynamos; station equipment; cost of power, systems of metering; electric distribution and wiring; electric lighting. Illustrative problems. Preparation required: 322, 324. First term (2).

372. Electrical Design. Continuation of 368. Calculations of alternating current apparatus, including generators, motors, transformers, and rotary converters leading up to original designing; drafting. Preparation required: 364, 365, 368. Second term (3).

373. Electric Traction. The construction, equipment and operation of different types of electric railways. The application of electric traction under steam railroad conditions; the dynamics of electric train movement; predeterminations of speed-time curves and the power required for different types of runs. Choice of car equipment; cost of construction and of operation. Testing of railway systems. Visits of inspection to power plants are made and reports required. Preparation required: 364, 365. Second term (3).

374. Electric Power Transmission. The long distance transmission of power by electricity for use in lighting, traction, mining and manufacturing work. Comparison of electric transmission and other systems. The design, construction, maintenance and protection of lines; the effects of inductance and capacity on the operation of the power system; the generating plant and receiving systems. Preparation required: 335 or 364, 361 or 362, 369. Second term (3).

375. Electrical Engineering Seminary. Continuation of 370. Reports on thesis work are presented and discussed. Preparation required: 364, 365, 369, 370. Second term (1).

376. Dynamo Laboratory. Continuation of 367. Alternating current testing; methods of determining the regulation of alternators; tests on single-phase induction and series (commutator) motors. Deposit $12. Preparation required: 364, 365, 366, 367. Second term (2).

377. Dynamo Laboratory. Experimental studies and tests of direct and alternating current machines. Adapted to students who have not taken 360, 365, 366, 367. Deposit $12. Preparation required: 335, 355 (or 359). Second term (2).

378. Electrotechnology. General survey of the more important industrial applications of electricity with special reference to the requirements of mining and civil engineering. Construction, equipment and operation of electric railways; elementary principles of alternating currents with applications to machinery; comparison of systems of power transmission and distribution; illustrative problems. Preparation required: 371. Second term (2).

379. Inspection Report. During the vacation between the Junior and Senior years each student in Electrical Engineering is required to inspect some electric railway system, lighting or power plant, or other electrical installation, and prepare a written report thereon. A descriptive outline of the installation which the student proposes to inspect must be submitted to the Professor of Electrical Engineering before July 15th, and after approval the detailed report must be handed in before September 12th. These reports should contain such calculations, photographs, drawings and plots as each individual case may require.

380. Thesis for Degree of E.E. Each candidate for the degree of Electrical Engineer is required to present a thesis upon a subject chosen by the candidate during the first term of the Senior year. The work upon which the thesis is based is done during the second term, and it consists in part of reading from references furnished by the professor in charge, and in part of independent work in theory, experimental research, or designing. Reports of progress on thesis work are required from time to time during the term. Much importance is attached to the thesis as evidence of the candidate's ability to carry out an independent investigation. Second term (4).

A deposit of $6 for each term-hour (period) of dynamo laboratory work taken per term is required of each student. The amount of this deposit is also stated in the description of each

of the above laboratory courses and is to cover breakage, wear and tear of apparatus, appliances, etc., and the unused balance is returned to the student.

For Summer Schools see Courses 201, 350, 206, and 374, also statement on page 80.

CHEMISTRY.

PROFESSOR SCHOBER, ASSISTANT PROFESSOR ULLMANN, MR. DIEFENDERFER, MR. BECK, DR. BABASINIAN, MR. BEATTIE, DR. BERKELEY, MR. EDGAR, MR. MC ADAM.

390. Elementary Chemistry. Description of the non-metallic and metallic elements and their compounds. Lectures illustrated by experiments, diagrams, working drawings, lantern pictures, and specimens from the museum. Note-books on the lectures required. Reference book: Remsen's Inorganic Chemistry, Advanced Course. First term (2).

391. Chemical Laboratory. Experiments covering a systematic study of the chemical and physical properties of the more important elements and their compounds. First term (2).

392. Qualitative Analysis. Practical work in the qualitative laboratory, accompanied by lectures and recitations. Text-book: Treadwell's Analytical Chemistry, Vol. I. Second term (3).

393. Qualitative Analysis. Shorter courses. Second term (3), (2), or (1).

394. Stoichiometry. Chemical problems, and reactions. Text-book: Whiteley's Chemical Calculations. Second term (1).

395. Chemical Philosophy. Theories of Chemistry; physical and chemical methods of determining atomic and molecular weights, solutions, electrolysis, thermo-chemistry, etc. Text-books: Tilden's Chemical Philosophy; Whiteley's Chemical Calculations; Remsen's Inorganic Chemistry, Advanced Course. First term (3).

396. Quantitative Analysis. Practical work in the quantitative laboratory, accompanied by lectures and recitations. Acidimetry, alkalimetry, chlorimetry, and the determination and analysis of simple chemical compounds and ores. Text-book: Treadwell's Analytical Chemistry, Vol. II, Fresenius's Quantitative Analysis, edited by Allen and Johnson. First term (5).

397. Quantitative Analysis. Shorter course. Practical work in the quantitative laboratory. Analysis of simple chemical compounds, ores, and metallurgical products. First term (3).

398. Quantitative Analysis Conference. Lectures and recitations concerning the laboratory work of course 396. First term (1).

399. Quantitative Analysis. Continuation of course 397. Second term (4).

400. Quantitative Analysis. Continuation of the course 396. Analysis of minerals, ores, slags, alloys, etc. Text-books: Treadwell's Analytical Chemistry, Vol. II, Fresenius's Quantitative Analysis, Blair's Chemical Analysis of Iron. Second term (7).

401. Quantitative Analysis. Shorter course. Continuation of course 397. Second term (4). Continuation of course 396. Second term (2).

402. Quantitative Analysis Conference. Lectures and recitations concerning laboratory work of course 400. Second term (2) or (1).

403. Advanced Chemistry. The elements and their compounds. Text-book: Newth's Inorganic Chemistry (with appendix). Second term (3).

405. Quantitative Analysis. Continuation of course 400. Ores and alloys; complete analysis of iron and steel; also gas analysis, mineral water analysis, etc. Text-books: Treadwell's Analytical Chemistry, Vol. II, Fresenius's Quantitative Analysis, Hempel's Gas Analysis. First term (6).

406. Quantitative Analysis. Shorter course. Second term (3) or (2).

407. Quantitative Analysis Conference. Discussions concerning the laboratory work of course 405. First term (2).

408. Quantitative Analysis. Continuation of course 399. Analysis of ores and metallurgical products, and gas analysis. First term (3) or (2).

409. Organic Chemistry. Lectures and recitations. Typical compounds of carbon, their classification, general relations, and methods of preparation of important compounds. Text-books: Remsen's Introduction to the Study of Carbon Compounds; Richter's Organic Chemistry, translated by Smith. Second term (4).

410. Organic Chemistry. Practical laboratory work. Determinations of specific gravities, melting points, boiling points, vapor densities; quantitative determinations of carbon, hydrogen, nitrogen, and the halogens. The preparation of about thirty-five pure organic compounds. Text-books: Gattermann's Practical Methods of Organic Chemistry, translated by Schober; Levy's Anleitung zur Darstellung Organischer Präparate. Second term (4).

411. Industrial Chemistry. Preparation of a number of chemically pure inorganic salts from minerals, commercial products, etc.; of various dyes and dye mixtures, and the dyeing of cotton, silk, and woolen fabrics; calico printing; manufacture of coal gas; fermentation; bleaching. First term (3).

412. Assaying. Lectures and laboratory practice in the furnace assay of the ores of lead, tin, antimony, gold, silver, and iron; also gold and silver bullion analysis by processes practiced in the United States Mint. Text-book: Lodge's Notes on Assaying. First term (3).

413. Industrial Chemistry. Lectures on the chemical industries, illustrated by experiments, diagrams, lantern pictures, and specimens from the museum of chemistry. Second term (3).

414. Industrial Analysis. Analysis of commercial products. Laboratory work. Text-book: Allen's Commercial Organic Chemistry. Second term (3).

415. Industrial Analysis Conference. Lectures concerning the laboratory work of the course 414. Second term (1).

416. Sanitary Chemistry. Qualitative and quantitative examination of air, water, food, disinfectants, baking-powders, flour, bread, tea, coffee, cocoa, spices, milk, butter, lard, beer, and other substances connected with this branch of the science. Second term (3).

417. Physical Chemistry. Lectures and recitations. Text-book: Jones's Physical Chemistry. First term (3).

418. Physical Chemistry. Laboratory work. Determination of molecular weights and physico-chemical measurements. First term (1).

421. Thesis for Degree of B.S. or Ch.E. Candidates for the degrees of B.S. in Chemistry and Ch.E. are required to present theses on some subject, approved by the Professor of Chemistry, involving practical work in the laboratory and use of

the library. The thesis is regarded as part of the final examinations of the courses.

Deposits to cover breakage, chemicals, etc., are required in the above courses, as follows: Five dollars in course 418; ten dollars each in courses 391 and 414; fifteen dollars in course 416; twenty dollars each in courses 408 and 411; twenty-five dollars each in courses 392, 393, 397, 401, 406, and 412; thirty dollars each in courses 396, 399, 400, and 405; thirty-five dollars in course 410. The unused portion of the deposit is returned to the student.

Summer Schools. Courses in Elementary Chemistry, Qualitative and Quantitative Analysis, Stoichiometry, and Assaying, begin July 29, 1908, and continue five weeks. They are open to all persons prepared to take them.

PHYSICAL EDUCATION.

PROFESSOR DAVIS.

440. Gymnasium. Class exercises, with both light and heavy apparatus, designed to promote health, strength, and muscular control. Recreative exercise. Corrective exercises to overcome individual defects. Out-of-door exercise. First and second terms (2).

SUMMER SCHOOLS.

The summer schools in shop inspection and sketching of machine parts, at the end of the Freshman year in the courses of Mechanical Engineering, Electrical Engineering, Metallurgical Engineering, Electrometallurgy, and Chemical Engineering, and in Mechanical Technology at the end of the Sophomore year in these courses, the summer school in Topographic Surveying in the course of Civil Engineering at the end of the Junior year, and in the course of Mining Engineering at the end of the Sophomore year, the summer school in Mine and Railroad Surveying in the course of Mining Engineering at the end of the Junior year, and also the summer school in Engineering Laboratory in the courses of Mechanical Engineering and Chemical Engineering at the end of the Junior year are required studies and are therefore to be regarded as the summer terms of the courses. Likewise the in-

struction in Land Surveying at the end of the Freshman year is required of the students in the course of Mining Engineering, but is extra for the students in the course of Civil Engineering, for the reason that this subject is regularly scheduled in the second term of the Sophomore year, and students desiring to take it out of the regular course pay for it as an extra study. Students not connected with the University may be admitted to the courses in Surveying if properly qualified. For this purpose special arrangement must be made with the Professor of Civil Engineering for the courses in Land and Topographic Surveying, and with the Professor of Mining Engineering for the course in Mine and Railroad Surveying.

In addition to this required summer work, there are also summer schools in Mathematics, Astronomy, Strength of Materials, Hydraulics, Chemistry, Physics, German, French, Mineralogy, and Metallurgy designed primarily for students of the University who are deficient in these subjects. But others not connected with the University may be admitted if properly qualified. These last mentioned summer schools, with the exception of the summer schools in Chemistry, begin in August. A special circular giving details, fees required, etc., will be sent to those applying for it.

SCHOOL OF GENERAL LITERATURE.

PURPOSE AND METHOD.

The purpose of this department of the University is to provide systematic courses of study which shall meet the requirements of a liberal education, and lay the foundation for the study of the several professions and for the intelligent following of business and industrial pursuits. The University desires that these courses be not merely academic in character, but of practical worth, and sustain a direct relation to the sphere of life which each student has before him. That the culture-purpose which is the basis of them may not be ignored, a limited amount of work in subjects of a literary, philosophic, and scientific character, which are both accepted instruments of culture and necessary preliminaries of all higher study, is required of each student. The required work includes courses in the English, German, French, Latin, and Greek languages and literatures, in mathematics, physics, chemistry, economics, psychology, and philosophy. Beyond this the work is elective. Until the second term of the Sophomore year the studies are prescribed; from then on they become increasingly subject to the student's own choice.

In pursuance of the policy of making these courses practical and directly preparatory to each student's life-work, large freedom is allowed in the choice of electives. Any study which is taught in the University may be taken, subject to the qualification and purpose of the student. Students are counseled to select their work systematically with reference to some definite end. In this they receive the assistance and coöperation of the Faculty, under the oversight of one of whose members each student arranges his course. Endeavor is made to treat students individually rather than in groups, and to suit the work of each to his needs and qualifications. Instruction is given by lectures, by recitations, by the assignment of readings and of topics for special study and dissertations, and when the subject admits of it, by practical work in field or laboratory. Field-work or laboratory work accompanies courses in surveying, geology, physics, chemistry, astronomy, biology, psychology, and allied subjects.

ADMISSION, CLASSIFICATION, DEGREE.

The requirements for admission are stated in detail on pages 26 and 27. On the basis of these the studies of the School of General Literature are classified, for the sake of convenience, into the Classical and Latin-Scientific courses. Greek is required in the Classical course; its place is taken in the Latin-Scientific course by modern languages, mathematics, and science. Except for such separation as grows necessarily out of this difference in the qualifications for admission the two courses are parallel.

The course of study extends over four years. Students, however, who can do so, are permitted to pass off required work in advance and to fill up the time thus left free with other advanced studies, with a view to completing the requirements for graduation in a shorter time.

The degree of Bachelor of Arts is bestowed upon all graduates of the School of General Literature.

PREPARATION FOR LAW, MEDICINE, TEACHING, ETC.

Young men who have in view the professions of law, medicine, theology, teaching, or journalism, will find in the courses of study which this department of the University offers that general and special preliminary training which is more and more becoming essential. For the better preparation of such men for entrance upon their professional studies the University is constantly enlarging its curriculum as need determines. Laboratory work accompanies the courses in psychology, a practice school is conducted in connection with the courses in Education, and the fine equipment of Williams Hall has provided superior facilities for the teaching of biology and zoölogy, and for practical courses in bacteriology. The opportunities which the biological, chemical, and physical laboratories of the University afford for preliminary medical studies are unsurpassed.

COMBINATION OF LITERARY AND TECHNICAL STUDIES.

The desirability of a liberal training for an engineer has led the University to offer courses in which, by combining the studies of the several technical departments with the work of the School of General Literature, a student may gain both a literary and a professional education, with the corresponding degrees, in six years. These courses possess decided advantages over the usual engineering curriculum of four years, the studies of which are

necessarily almost wholly technical; and the value of the wider training for which they provide far outweighs the extra expenditure of time. The outline in full of a combined course leading to the degrees of B.A. and C.E. is printed on pages 88 and 89.

TABULAR EXHIBITION OF STUDIES.

The following tables of studies exhibit the required and the ordinary elective studies of the School of General Literature. Those peculiarly technical studies which enter into the combined courses are not here printed in the lists of electives. Further information regarding this department of the University, the systematic arrangement of work preparatory to professional study, to teaching, etc., can be found in the circular of the School of General Literature, copies of which may be had by addressing the Registrar of the University.

THE CLASSICAL COURSE.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Sol.Geom.andTrig.,(4)	140,141	Mechanics, (5)	142
Greek, (4)	50	Greek, (4)	51
Latin, (4)	40	Latin, (4)	41
German, (3)	90	German, (3)	91
English, (3)	120, 121, 125	English, (2)	122, 125
Gymnasium, (2)	440	Gymnasium, (2)	440

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM (*Required*).	
Greek, (3)	52	Greek, (3)	53
Latin, (3)	42	Latin, (3)	43
German, (3)	94	German, (3)	95
French, (3)	70	French, (3)	71
English, (2)	123, 126	English, (2)	124, 126
Physics, (3)	323	(*Elective, four hours*).	
Physical Laboratory, (1)	324	Greek, (2)	54
Public Speaking, (1)	139	Latin, (2)	44
		History, (2)	30
		Descriptive Geometry,(3)	161
		*Land Surveying, (4)	163
		Physics, (3)	325
		Physical Laboratory, (1)	326
		Botany, (2)	290
		Forestry, (1)	291
		Physiography, (3)	277

*May be taken in the Summer Term after the Sophomore year.

JUNIOR YEAR.

FIRST TERM (*Required*).

Psychology, (2)	1
Economics, (2)	20
English, (1)	127
Chemistry, (2)	390
Chemical Laboratory, (2)	391
(*Elective, eight hours*)	
Greek, (3)	55
Latin, (3)	45
French, (3)	74
German, (3)	96 *or* 98
English, (3)	129
History, (3)	31
Mathematics, (4)	143, 145
Elec. and Magnetism, (2)	327
Electrical Laboratory, (1)	328
Crystallography, (2)	240
Geology, (2)	270
Biology, (3)	292
Education, (2)	10

SECOND TERM (*Required*).

Psychology, (2)	2
Economics, (2)	21
(*Elective, thirteen hours*)	
Greek, (3)	56
Latin, (3)	46
French, (3)	75
German, (3)	97 *or* 98
English, (3)	130
History, (3)	32
Astronomy, (3)	149
Alternating Currents, (2)	335
Electrical Laboratory, (1)	329
Mineralogy, (3)	241
Blowpipe Analysis, (1)	243
Qualitative Analysis, (3)	393
Stoichiometry, (1)	394
Geology, (2)	271
Comparative Anatomy, (3)	293
Education, (2)	11
Scientific Method, (2)	9

SENIOR YEAR.

FIRST TERM (*Required*).

History of Philosophy, (2)	7
(*Elective, fifteen hours*)	
Greek, (3)	57
Latin, (3)	47
German, (3)	99
French, (3)	76 *or* 78
Spanish, (3)	111
English, (3)	131
Economics, (2)	22
Public Law, (2)	26 *or* 28
Analytic Geometry, (5)	146
Theory of Light, (5)	330
Alternating Currents, (2)	357
Chemical Philosophy, (3)	395
Quantitative Anal., (3)	397
Lithology, (2)	270
Geology, (3)	272
Embryology, (2)	294
Bacteriology, (2)	296
Psychology, (2), (3), *or* (4)	3,6
Education, (2)	12

SECOND TERM (*Required*).

History of Philosophy, (2)	8
Thesis, (3)	
(*Elective, twelve hours*).	
Greek, (3)	58 *or* 59
Latin, (3)	48
German, (3)	99
French, (3)	77 *or* 78
Spanish, (3)	112
English, (3)	132 *or* 133
Economics, (2)	23
Public Law, (2)	27 *or* 29
Calculus, (5)	147
Astronomy, (3)	149
Theory of Heat, (4)	331
Alternating Currents, (2)	360
Advanced Chem., (3)	403
Quantitative Anal., (4)	399
Physiography, (3)	277
Psychology, (2), (3), *or* (4)	4,6
Education, (2)	12

The figures in parentheses indicate the number of exercises per week.

THE LATIN-SCIENTIFIC COURSE.

FIRST TERM. FRESHMAN YEAR.		SECOND TERM.	
Mathematics, (5)	143,144,145	Mechanics, (5)	142
Latin, (4)	40	Latin, (4)	41
German, (3)	94	German, (3)	95
or French, (3)	74	*or* French, (3)	75
Freehand Drawing, (1)	155	English, (2)	122, 125
English, (3)	120, 121, 125	Descriptive Geometry, (3)	161
Gymnasium, (2)	440	Gymnasium, (2)	440

FIRST TERM.		SECOND TERM (*Required*).	
Latin, (3)	42	Latin, (3)	43
German, (3)	96 *or* 98	German, (3)	97 *or* 98
French, (3)	70, 76, *or* 78	French, (3)	71, 77, *or* 78
English, (2)	123, 126	English, (2)	124, 126
Physics, (3)	323	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
Chemistry, (2)	390	(*Elective, four hours*)	
Chemical Laboratory, (2)	391	Latin, (2)	44
Public Speaking, (1)	139	History, (2)	30
		*Land Surveying, (4)	163
		Qualitative Anal., (3)	393
		Stoichiometry, (1)	394
		Botany, (2)	290
		Forestry, (1)	291
		Physiography, (3)	277

FIRST TERM (*Required*). JUNIOR YEAR.		SECOND TERM (*Required*).	
Psychology, (2)	1	Psychology, (2)	2
Economics, (2)	20	Economics, (2)	21
French, (3)	74	French, (3)	75
or German, (3)	94	*or* German, (3)	95
English, (1)	127	(*Elective, ten hours*)	
(*Elective, nine hours*)		Latin, (3)	46
Latin, (3)	45	German, (3)	99
German, (3)	99	*or* French, (3)	79
or French, (3)	79	English, (3)	130
English, (3)	129	History, (3)	32
History, (3)	31	Calculus, (5)	147
Analytic Geometry, (5)	146	Astronomy, (3)	149
Elec. and Magnetism, (2)	327	Mineralogy, (3)	241
Electrical Laboratory, (1)	328	Blowpipe Analysis, (1)	243
Crystallography, (2)	240	Advanced Chem., (3)	403
Chemical Philosophy, (3)	395	Quantitative Anal., (4)	399
Quantitative Anal., (3)	397	Alternating Currents, (2)	335
Geology, (2)	270	Electrical Laboratory, (1)	329
Biology, (3)	292	Astronomy, (3)	149
Education, (2)	10	Geology, (2)	271
		Comparative Anatomy, (3)	293
		Education, (2)	11
		Scientific Method, (2)	9

*May be taken in the Summer Term after the Sophomore year.

SENIOR YEAR.

FIRST TERM (*Required*).		SECOND TERM (*Required*).	
History of Philosophy, (2)	7	History of Philosophy, (2)	8
(*Elective, fifteen hours*)		Thesis, (3)	
Latin, (3)	47	(*Elective, twelve hours*)	
French, (3)	80	Latin, (3)	48
German, (3)	100	French, (3)	80 *or* 81
Spanish, (3)	111	German, (3)	100
English, (3)	131	Spanish, (3)	112
Economics, (2)	22	English, (3)	132 *or* 133
Public Law, (2)	26 *or* 28	Economics, (2)	23
Analytical Mechanics, (2)	148	Public Law, (2)	27 *or* 29
Prac. Astronomy, (3)	150	Physiography, (3)	277
Alternating Currents, (2)	357	Alternating Currents, (2)	360
Theory of Light, (5)	330	Theory of Heat, (4)	331
Geology, (3)	272	Organic Chemistry, (4)	409
Embryology, (2)	294	Psychology, (2), (3), *or* (4)	4,6
Bacteriology, (2)	296	Education, (2)	12
Psychology, (2), (3), *or* (4)	3,6		
Education, (2)	12		

The figures in parentheses indicate the number of exercises per week.

COMBINED ACADEMIC AND ENGINEERING COURSES.

The University considers it desirable that young men who expect to follow an engineering profession receive a broader education than is possible in an engineering course of four years' duration which must of necessity be occupied almost exclusively by subjects of a technical and professional character. A good many subjects which are essential to an engineering curriculum are proper also to academic courses. But an academic student who subsequently proceeds to engineering study often finds that his training in these common branches has been inadequate to the successful application of them to engineering work. Time can be saved and more efficient preparation given when they are under one common guidance. The University is able, by systematically combining the studies of its several engineering schools with the studies peculiar to the School of General Literature, to offer courses of six years' duration which lead to the degree of Bachelor of Arts and an engineering degree, and in which neither the purpose nor the efficiency of either course is sacrificed. Students in these courses receive the Bachelor's degree at

the end of four years, and the engineering degree upon the completion of the engineering studies.

Following is an outline in full of such a course leading to the degrees of Bachelor of Arts and Civil Engineer. For the sake of brevity, the course is printed only for a Latin-Scientific student, who has presented German for admission. Classical students, or Latin-Scientific students presenting French for admission, may select a similar course. Combined courses leading to other engineering degrees are also provided.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Mathematics, (5)	143, 144, 145	Mechanics, (5)	142
Latin, (4)	40	Latin, (4)	41
German, (3)	94	German, (3)	95
Freehand Drawing, (1)	155	English, (2)	122, 125
English, (3)	120, 121, 125	Descriptive Geometry, (3)	161
Gymnasium, (2)	440	Gymnasium, (2)	440

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Latin, (3)	42	Latin, (3)	43
German, (3)	96 *or* 98	German, (3)	97 *or* 98
French, (3)	70	French, (3)	71
English, (2)	123, 126	English, (2)	124, 126
Physics, (3)	323	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
Chemistry, (2)	390	Land Surveying, (4)	163
Chem. Laboratory, (2)	391		
Public Speaking, (1)	139		

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Psychology, (2)	1	Psychology, (2)	2
Economics, (2)	20	Economics, (2)	21
English, (1)	127	Qualitative Anal., (3)	393
French, (3)	74	Calculus, (5)	147
Analytic Geometry, (5)	146	(*At least four hours from following.*)	
(*At least four hours from following.*)		Latin, (3)	46
Latin, (3)	45	English, (3)	130
English, (3)	129	German, (3)	99
German, (3)	99	French, (3)	75
Biology, (3)	292	Comparative Anatomy, (3)	293
History, (3)	31	History, (3)	32
Education, (2)	10	Education, (2)	11
		Scientific Method, (2)	9

SENIOR YEAR.

FIRST TERM.

History of Philosophy, (2) 7
Construction, (2) 167
Stereotomy, (4) 162
(*At least nine hours from following.*)
Latin, (3) 47
German, (3) 100
French, (3) 79 *or* 80
Spanish, (3) 111
English, (3) 131
Economics, (2) 22
Public Law, (2) 26 *or* 28
Education, (2) 12
Quantitative Anal., (3) 397
Blowpipe Analysis, (1) 244
Geology, (3) 272

SECOND TERM.

History of Philosophy, (2) 8
Construction, (2) 168
Botany, (2) 290
Thesis, (3)
(*At least eight hours from following.*)
Latin, (3) 48
German, (3) 100
French, (3) 79 *or* 80
Spanish, (3) 112
English, (3) 132 *or* 133
Economics, (2) 23
Public Law, (2) 27 *or* 29
Education, (2) 12
Geology, (2) 273
Quantitative Anal., (4) 399
Sanitary Biology, (2) 295

SUMMER TERM.

Engineering Inspection, 180.

FIFTH YEAR.

FIRST TERM.

Analytic Mechanics, (2) 148
Strength of Materials, (4) 171
Railroads, (2) 169
Cement and Concrete, (2) 170
Graphic Statics, (4) 173
Crystallography, (2) 240

SECOND TERM.

Railroad Surveying, (5) 165
Hydraulics, (3) 175
Roofs and Bridges, (3) 174
Astronomy, (3) 149
Mineralogy, (2) 242

SUMMER TERM.

Topographic Surveying, 164.

SIXTH YEAR.

FIRST TERM.

Bridge Design, (6) 176
Sanitary Engineering, (4) 179
Electrotechnology, (2) 371
Geology, (2) 270
Geodetic Surveying, (3) 166
or Prac. Astronomy, (3) 150

SECOND TERM.

Bridges and Dams, (4) 178
Metallurgy, (3) 254
Geology, (2) 271
Steam Engine, (3) 205
Electric Railways, (2) 378
or Sanitary Biology, (2) 295
or Steel Buildings, (2) 177
Thesis, (3) 181

The figures in parentheses indicate the number of exercises per week.

THE COURSE IN CIVIL ENGINEERING

The requirements for admission to this course may be found on pages 28 and 29. While French will be accepted instead of German, it is recommended that the latter be offered, as its technical literature is of greater value to the civil engineer.

The program of studies of this course, given on page 93, shows the subjects required to be completed by candidates for the degree of Civil Engineer. The numbers following the subjects refer to the detailed descriptions on pages 42 to 80. The figures in parentheses indicate the number of exercises per week. Candidates for admission who are properly qualified will be given an opportunity to substitute Theoretical Chemistry during the first term of the Freshman year.

The purpose of this course is to give a broad education in those general and scientific subjects which form the foundation of all branches of technology, and special training in those subjects comprised under the term civil engineering. The graduate is not only prepared to enter upon the location and construction work of railroads, bridges, water works, or sewerage plants, but can advantageously take up allied work in mining, mechanical, electrical, or architectural engineering.

During the Freshman year the time is mostly devoted to fundamental studies which give both general culture and preparation for the technical work of the following years. The study of Mathematics, Physics, English, and German is continued. Chemistry is taught partly by lectures and partly by practical manipulation in the laboratory. Drawing is done throughout the year, freehand sketching in the first term and instrumental work in the second. There are lectures in Physiology and Hygiene, and systematic exercise in the gymnasium is required.

In the Sophomore year the fundamental subjects of Mathematics, Physics, and English are completed, and the technical work of civil engineering is begun by practical problems in Drawing and by lectures or recitations on Construction. The theory of Land Surveying is begun and is accompanied by field work and map drawing. Those who desire to take this subject in the vacation at the end of the Freshman year will be allowed to do so under the regulations stated on page 56.

The work in Topographic Surveying is done in the four weeks following the end of the Junior year. By this arrangement the attention of the student is concentrated upon a single subject, thus enabling practical field operations to be exemplified in the best possible manner. In Railroad Surveying both preliminary and final locations of a line are made, and plans, profiles, and estimates of cost are prepared. In Geodetic Surveying triangulations of a high degree of precision are executed, as also determinations of azimuth, and adjustments of the results are made by the standard methods. A large collection of levels, transits, and other surveying tools enables the student to become familiar with the instruments of the best manufacturers.

Under the head of Construction and of Cement and Concrete are grouped the topics of masonry, foundations, roads and pavements, cements and mortars, walls, dams, arches, tunnels, and details of structures. The work covers three terms and is mainly by recitations, using standard books and engineering journals. Visits of inspection to structures in the Lehigh Valley and vicinity are made, and written reports upon them are required. All the standard tests of cements and mortars are made by each student. In connection with the subject of Strength of Materials there is also work in the testing laboratory on timber, brick, iron, and steel.

Roofs and Bridges receive attention throughout four terms. The analysis of trusses by graphic methods is begun in the first term of the Junior year and later the analytical methods of computing stresses are taken up. Visits are made to bridges and sketches taken of details which are afterwards drawn to scale. Later, designs and working drawings are prepared by each student for both highway and railroad bridges. These drawings are made, dimensioned, and checked in the same manner as in the drawing room of a bridge company, and estimates of the final weight of the structure are prepared. The theory of cantilever, draw, suspension, and arched structures receives detailed attention, as also that of reinforced concrete structures. This extended training in bridge engineering furnishes a thorough foundation for successful work in practice.

Hydraulic and Sanitary Engineering are treated at length. The theory of the flow of water through orifices, weirs, pipes, and channels, together with the principles of hydraulic motors, is given in the Junior year, while in the Senior year the subjects

of water supply and sewerage are discussed. The methods of collecting, purifying, and distributing water are explained and compared; house drainage, the design of sewerage systems, and the disposal of sewage also receive attention. Computations for dams, standpipes, sewers and their appurtenances are made. Canal engineering, river and harbor work, and land drainage receive attention. Irrigation by both water and sewage is also discussed. This training in hydraulic and sanitary subjects, together with that in Construction, renders the graduate well qualified to enter upon the work of city engineering.

Among other required subjects may be noted that of Strength of Materials, which gives the theory of beams, columns, and shafts, and the methods of computing and designing them; as already noted, this subject is exemplified by practical work in the testing laboratory. The subject of Electrotechnology treats of the equipment and operation of trolley roads. The subjects of Crystallography and Metallurgy give excellent training in the observation of natural phenomena, and prepare the student for work in geology and mining.

During the Senior year there are several elective subjects offered. In the first term the student may elect either Practical Astronomy or Geodetic Surveying; in the second term he may take Electrotechnology, or Steel Buildings, or Sanitary Biology. Extra subjects may also be pursued, by permission of the Faculty, if the time of the student permits, and opportunity for the study of Spanish is afforded. In these subjects, as well as in all the work of this course, it is the aim to exemplify the theoretical principles by practical problems, inspections, designs and laboratory exercises. The testing laboratory of the University contains machines for making physical tests of tension, compression, flexure and torsion, and is of special value to students who prepare theses on investigations of the properties of materials.

The student who completes this course will receive the degree of Civil Engineer. Mature young men desiring to take special studies without being candidates for the degree will be afforded every facility in so doing. Graduates of this course may become candidates for the degree of Master of Science under the regulations stated on page 32.

THE COURSE IN CIVIL ENGINEERING.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Mathematics, (5)	143,144,145	Mechanics, (5)	142
Chemistry, (2)	390	Physics, (2)	320
Chemical Laboratory, (2)	391	Physical Laboratory, (1)	321
German, (3)	94	Descriptive Geometry, (3)	161
or French, (3)	74	Forestry, (1)	291
Freehand Drawing, (1)	155	German *or* French, (3)	95 *or* 75
English, (3)	120, 121, 125	English, (2)	122, 125
Gymnasium, (2)	440	Gymnasium, (2)	440

SUMMER TERM.

Land Surveying (optional), 163.

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Geometry, (5)	146	Calculus, (5)	147
Physics, (3)	322	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
Construction, (2)	167	Construction, (2)	168
Stereotomy, (4)	162	Land Surveying, (4)	163
English, (2)	123, 126	English, (3)	124, 126, 128
Public Speaking, (1)	139		

SUMMER TERM.

Engineering Inspection, 180.

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Mechanics, (2)	148	Railroad Surveying, (5)	165
Strength of Materials, (4)	171	Hydraulics, (3)	175
Railroads, (2)	169	Roofs and Bridges, (3)	174
Cement and Concrete, (2)	170	Astronomy, (3)	149
Graphic Statics, (4)	173	Economics, (1)	21
Economics, (1)	20	Mineralogy, (2)	242
Crystallography, (2)	240		

SUMMER TERM.

Topographic Surveying, 164.

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Bridge Design, (6)	176	Bridges and Dams, (4)	178
Sanitary Engineering, (4)	179	Metallurgy, (3)	254
Electrotechnology, (2)	371	Geology, (2)	271
Geology, (2)	270	Steam Engine, (3)	205
Geodetic Surveying, (3)	166	Electrotechnology, (2)	378
or Prac. Astronomy, (3)	150	*or* Sanitary Biology, (2)	295
		or Steel Buildings, (2)	177
		Thesis, (3)	181

The figures in parentheses indicate the number of exercises per week.

THE COURSE IN MECHANICAL ENGINEERING.

The object of this course is the study of the Science of Machines. The principal subjects taught are: the nature, equivalence, and analysis of mechanisms, the mechanics or theory of the principal classes or types of machinery, mechanical technology, the principles and practice of machine design, and the measurements of power.

The earliest shop visits are for the purpose of acquainting beginners with machine parts and the usual tools of a shop. These visits are a part of the work of a summer term, lasting four weeks, which is held at the close of the second term of the Freshman year.

In the same summer term the students of Mechanical Engineering are also given a course in the examination of electrical instruments and machinery and in the inspection of their use and operation in electrical plants. This is regarded as a very desirable preliminary to the study of Physics and to the special course in Electrical Engineering which is pursued later on.

A second summer term at the end of the Sophomore year provides a course of shop instruction (Mechanical Technology) which does not necessarily involve manual labor and manipulation of tools, but is principally devoted to familiarizing the students with those points in pattern-making, moulding, forging, fitting and finishing, which they need to know as designers of machinery.

During the course there are frequent visits of inspection to the Bethlehem Steel Company, to the Lehigh Valley R. R. shops at Easton, and to other engineering works both in and out of town, with special reference to such subjects as prime movers, machinery for lifting, handling, and transporting, and machinery for changing the form and size of materials.

The instruction in Machine Design begins in the first term of the Sophomore year and is continued throughout the year. At first, tracings and blue-prints of good examples of drawings of machinery are made. A thorough drill in projection drawing follows; in this work freehand sketches are first made, and measurements taken, of machine pieces; these sketches are then converted into full-sized drawings. Then there is considerable practice in the interpretation of such drawings, and general

views of lathes, planers, drills, and shapers are made from the drawings of the details. This is followed by difficult projections and intersections and exercises in the empirical proportioning of machine parts. Both empirical and rational formulas are used to determine the dimensions of fastenings, bearings, rotating and sliding pieces, belt and toothed gearing, levers and connecting rods, the data being given as they would arise in practice and the drawings made full size. In the last year the Seniors undertake the calculations, estimates, and working drawings involved in the design of simple but complete machines, each student being engaged upon different machines. In the case of these machines and of the engine the general plan of arrangement will be given to the students in the form of rough sketches, photographs or woodcuts. In the last term the students are expected to make original designs for simple machinery, the object of which has been fully explained.

The students in Mechanical Engineering are given a special course in Electrical Engineering after they have finished the regular and general course in Physics. The object is to impart a clear conception of electrical units and a working knowledge of resistance, impedance, inductance, reactance, capacity, and the magnetism of iron, and the magnetic circuit as used in the construction of electrical machinery. Attention is then directed to the theory and calculation of direct current dynamos, to the study of variable and alternating current phenomena, and to the theory of the alternating current transformer. Practical problems are given in these subjects to show their application. The laboratory work which accompanies this special course involves tests of resistance, insulation, consumption of energy, and efficiency. Instruction is also given in locating and remedying the common faults of dynamos and motors.

The course in Engineering Laboratory begins with the handling and calibration of the instruments and appliances belonging to the experimental side of mechanical engineering; the simpler tests and experiments, along various lines, are taken up next; and there is a gradual progress toward complex operations as the complete test of a power plant or pumping station, or a full thermodynamic test of the steam engine. The course is, at present, most fully developed in the field of steam engineering, where it embraces steam calorimetry, flow of steam, the testing of steam-traps and separators, and of injectors, small pumps,

and the steam turbine; extensive practice with the indicator, engine tests of various sorts, and boiler testing.

Work with compressed air, tests of hot-air engines, of centrifugal pumps, and of various incidental appliances and apparatus, are to be given due place in the course. Gas engineering, in particular, will be well provided for when the new laboratory in Williams Hall is fully equipped. This laboratory will also be devoted to dynamometer work and power transmitting machinery, with experiments in friction and lubrication, and determination of the efficiency of machines.

The purpose of this course, kept in view in the equipment and arrangement of the laboratory, is to provide a system of well selected and graded experiments which will illustrate and impress principles, develop the skill and judgment of the student, and give a broad training in the idea, method, and detail of this sort of work. For this course the Steam Engineering Laboratory and the additional space reserved in Williams Hall are available for the experimental apparatus, machinery, and motors, presented by Mr. Warren A. Wilbur to the department of Mechanical Engineering.

All the students in this course are required to study both German and French.

Graduates in this course receive the degree of Mechanical Engineer (M.E.).

THE COURSE IN MECHANICAL ENGINEERING.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Geometry, (6)	146	Calculus, (6)	147
Chemistry, (2)	390	Physics, (2)	320
Chemical Laboratory, (2)	391	Physical Laboratory, (1)	321
German, (3)	94	Qualitative Analysis, (3)	393
or French, (3)	74	Stoichiometry, (1)	394
Freehand Drawing, (1)	155	German, (3)	95
English, (3)	120, 121, 125	*or* French, (3)	75
Gymnasium, (2)	440	English, (2)	122, 125
		Gymnasium, (2)	440

SUMMER TERM.

Constructive Elements of Machinery and of Electrical Apparatus, 201, 350.

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Mechanics, (4)	142	Analytic Mechanics, (2)	148
Physics, (3)	322	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
Draw'g and Mach.Des.,(3)	200	Steam Engine, (4)	204
Boilers, (1)	203	French, (3)	71
French, (3)	70	*or* German, (3)	91
or German, (3)	90	English, (2)	124, 126
English, (2)	123, 126	Machine Design, (3)	202
Public Speaking, (1)	139		

SUMMER TERM.

Mechanical Technology, 206.

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Mech. of Machinery, (2)	207	Mech. of Machinery, (3)	211
Graphic Statics, (2)	172	Hydraulics, (3)	175
Dynamos and Motors, (2)	354	Electrical Laboratory, (1)	329
Dynamo Laboratory, (1)	355	Engineering Lab., (1)	209
Elec. and Magnetism, (2)	327	Electrical Eng., (2)	362
Electrical Laboratory, (1)	328	Dynamo Laboratory, (1)	356
Engineering Lab., (2)	208	Alternating Currents, (2)	335
Strength of Materials, (4)	171	Metallurgy, (3)	254
Economics, (1)	20	Economics, (1)	21
French, (2)	72	French, (2)	73
or German, (2)	92	*or* German, (2)	93

SUMMER TERM.

Engineering Laboratory, 212.

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Thermodynamics, (5)	216	Machine Design, (5)	224
Kinematics of Mach., (4)	217	Engineering Lab., (1)	228
Machine Design, (5)	218	Mech. of Machinery, (4)	227
Engineering Lab., (1)	220	Steam Turbines, (5)	229
Gas Engines, (3)	230	Thesis, (3)	231
Business Law, (1)	24		

A special option in Electrical Engineering may be arranged.

The figures in parentheses indicate the number of exercises per week.

THE COURSE IN METALLURGICAL ENGINEERING.

This course is designed to prepare the student for practice in the field of metallurgy. In addition to the general studies underlying all technical education, instruction is given in Freehand and Projection Drawing, the Strength of Materials, Testing Laboratory, Mechanical Technology, Steam Boilers, the Steam Engine, the Mechanics of Machinery, involving the study of hoisting and pumping engines, air compressors, blowing engines, fans, etc., and the graphic statics of mechanisms, the Measurement of Power, Hydraulics, including hydraulic motors, and Electrotechnology, including the theory of electric motors and dynamos and laboratory work in electrical measurements. The student is thus made acquainted with the principles involved in the design and construction of the buildings and machinery constituting a metallurgical plant and in the operation of the machines.

A thorough course is given in Physics, including laboratory work in mechanics and calorimetry.

In Chemistry, in addition to the training in chemical theory involved in the courses of Stoichiometry and Chemical Philosophy, much time is devoted to work in the laboratory, involving the qualitative and quantitative analysis, both gravimetric and volumetric, of the more common ores and metallurgical products, including gas analysis and dry assaying. The student is thus made thoroughly familiar with the principles of the two chief sciences on which the operations of metallurgy are based and with the methods of analysis employed in the laboratories of smelting works.

Courses are given in Mineralogy and Blowpipe Analysis involving practice in the identification of crystals and of minerals by their physical properties and their behavior before the blowpipe. The mineralogical laboratory affords facilities for advanced courses in geometric and physical crystallography which are not included in the ordinary curriculum. An elective course in Quantitative Blowpipe Analysis is open to a limited number of students.

A course in Lithology gives practice in the microscopic examination of rocks and is followed by courses in Historic, Dynamic

and Economic Geology, and by two terms work in the microscopic examination of rocks and of metallurgical materials.

A course in Ore Dressing renders the student familiar with the principles and methods of the mechanical preparation of ores and fuels.

The special instruction in Metallurgy is begun by a course in Metallurgical Construction. The class is taken on visits of inspection to neighboring metallurgical works. Each student makes sketches and takes notes of an assigned portion of the plant. From these working drawings are made and memoirs written describing and discussing the plant inspected. The student is thus rendered familiar with the furnaces and apparatus employed in metallurgical establishments, and with the methods in use in their drafting rooms. Courses of lectures in Metallurgy extend throughout the year. In these the chief weight is laid upon the chemical and physical principles involved in the various metallurgical processes. In order to impress these principles upon the mind of the student and to render their application familiar he is required to solve a series of problems which embody them. The problems are chiefly such as confront the metallurgist in his practice. In the course of Metallurgical Design the class is required to design a metallurgical plant to be operated under given conditions, a certain portion being assigned to each student. This involves calculations of stresses, weights and costs, the execution of working drawings and the discussion of the methods and apparatus chosen.

The metallurgical laboratory affords opportunity for special investigations in subjects connected with Metallurgy to such advanced students as are competent to conduct them, while laboratory work is regularly given which includes practice in the use of calorimeters and pyrometers, and exercises in the methods of investigation and measurement which a metallurgist should know how to conduct.

The proximity of the works of the Bethlehem Steel Company and of the New Jersey Zinc Company, and the kindness of their officers, give opportunities for frequent visits of inspection by the students in classes and individually, and thus afford unusual facilities for the practical study of the metallurgy of iron and of zinc. Occasional visits of inspection are made to more distant works.

Graduates in this course receive the degree of Metallurgical Engineer (Met.E.).

THE COURSE IN METALLURGICAL ENGINEERING.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Mathematics, (5)	143,144,145	Mechanics, (5)	142
Chemistry, (2)	390	Physics, (2)	320
Chemical Laboratory, (2)	391	Physical Laboratory, (1)	321
German, (3)	94	Qualitative Analysis, (3)	393
or French, (3)	74	Stoichiometry, (1)	394
Freehand Drawing, (1)	155	German, (3)	95
English, (3)	120, 121, 125	*or* French, (3)	75
Gymnasium, (2)	440	English, (2)	122, 125
		Gymnasium, (2)	440

SUMMER TERM.

Constructive Elements of Machinery and of Electrical Apparatus, 201, 350.

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Geometry, (5)	146	Calculus, (5)	147
Physics, (3)	322	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
Draw. and Met. Con., (4)	250	Blowpipe Analysis, (1)	243
Crystallography, (2)	240	Mineralogy, (3)	241
English, (2)	123, 126	Met. Con. and Draw., (3)	251
Public Speaking, (1)	139	English, (2)	124, 126

SUMMER TERM.

Mechanical Technology, 206.

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Strength of Materials, (4)	171	Metallurgy, (5)	253
Boilers, (1)	203	Steam Engine, (3)	205
Geology, (3)	272	Geology, (2)	273
Ore Dressing, (3)	309	Economic Geology, (3)	274
Blowpipe Analysis, (1)	244	Quantitative Analysis, (4)	399
Chemical Philosophy, (3)	395		
Quantitative Analysis, (3)	397		

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Metallurgy, (4)	255	Mech. of Machinery, (4)	227
Assaying, (3)	412	Metallurgical Design, (2)	252
Quantitative Analysis, (3)	408	Metallurgical Lab., (1)	256
Electrotechnology, (2)	371	Hydraulics, (3)	175
Mech. of Machinery, (2)	207	Engineering Lab., (1)	222
Microscopic Petrology, (2)	279	Economics, (1)	21
Engineering Lab., (1)	221	Microscopic Petrology, (1)	282
Economics, (1)	20	Electrometallurgy, (1)	258
		Thesis, (6)	260

The figures in parentheses indicate the number of exercises per week.

THE COURSE IN ELECTROMETALLURGY.

This course is designed to prepare the student to enter the rapidly developing fields of electrometallurgy and electrochemistry.

For the first two years the course is identical with that in Metallurgical Engineering, embracing fundamental instruction in mathematics, physics, mineralogy, drawing, and modern languages. In the third and fourth years this course agrees with the Metallurgical Engineering course in the inclusion of chemical analysis, chemical philosophy, metallurgy, ore dressing, boilers, steam engine, measurement of power and the general culture studies; it differs from it by devoting less time to assaying, by omitting certain courses in Civil and Mechanical Engineering, and by devoting the time thus gained to electrical and electrochemical subjects. The subjects thus introduced are Advanced theory of Electricity and Magnetism, with practical work in measurement of current resistance, electromotive force, inductive capacity, magnetic testing of iron, etc.; Theory of Direct and Alternating-Current Dynamos and Motors, with experimental studies and tests, Electrical Generating Stations, Transmission and Receiving Systems; Theory of Electrolysis and Principles of Electrometallurgical and Electrochemical Practice, with experimental studies and tests in the laboratory.

Graduates in this course receive the degree of Electrometallurgist (El.Met.).

THE COURSE IN ELECTROMETALLURGY.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Mathematics, (5)	143,144,145	Mechanics, (5)	142
Chemistry, (2)	390	Physics, (2)	320
Chemical Laboratory, (2)	391	Physical Laboratory, (1)	321
German, (3)	94	Qualitative Analysis, (3)	393
or French, (3)	74	Stoichiometry, (1)	394
Freehand Drawing, (1)	155	German, (3)	95
English, (3)	120, 121, 125	*or* French, (3)	75
Gymnasium, (2)	440	English, (2)	122, 125
		Gymnasium, (2)	440

SUMMER TERM.

Constructive Elements of Machinery and of Electrical Apparatus, 201, 350.

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Geometry, (5)	146	Calculus, (5)	147
Physics, (3)	322	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
Draw. and Met. Con., (4)	250	Blowpipe Analysis, (1)	243
Crystallography, (2)	240	Mineralogy, (3)	241
English, (2)	123, 126	Met. Con. and Draw., (3)	251
Public Speaking, (1)	139	English, (2)	124, 126

SUMMER TERM.

Mechanical Technology, 206.

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Strength of Materials, (4)	171	Metallurgy, (5)	253
Boilers, (1)	203	Steam Engine, (3)	205
Ore Dressing, (3)	309	Quantitative Analysis, (4)	399
Chemical Philosophy, (3)	395	Alternating Currents, (2)	335
Quantitative Analysis, (3)	397	Electrical Eng., (2)	362
Blowpipe Analysis, (1)	244	Electrical Laboratory, (1)	329
Elec. and Magnetism, (2)	327	Dynamo Laboratory, (1)	353
Electrical Laboratory, (1)	328		
Dynamos and Motors, (2)	354		

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Metallurgy, (4)	255	Metallurgical Design, (2)	252
Quantitative Analysis, (3)	408	Engineering Lab., (1)	222
Blowpipe Analysis, (1)	245	Electric Power, (3)	374
Engineering Lab., (1)	221	Hydraulics, (3)	175
Electric Stations, (2)	369	Dynamo Laboratory, (2)	377
Dynamo Laboratory, (1)	355	Electrometallurgy, (1)	258
Theory of Electrolysis, (1)	257	Metallurgical Lab., (1)	256
Electrical Laboratory, (1)	334	Economics, (1)	21
Electromet. Lab., (1)	259	Thesis, (6)	261
Economics, (1)	20		

The figures in parentheses indicate the number of exercises per week.

THE COURSE IN MINING ENGINEERING.

The object of this course is to prepare the student for practice in the field of Mining Engineering. It is designed to give him not only the thorough training of the engineer, but also that broadness of education which enables him to readily undertake the great variety of propositions which naturally present themselves to one of his profession.

The course is therefore a very broad one, and when completed, it places him in the path of a great number of opportunities. Not only will he have had sufficient practice and training to enable him to enter upon the field of mining, but he can also readily take up the work in chemistry, geology, metallurgy, electrometallurgy, and in chemical, civil, electrical and mechanical engineering.

The principal objects in view, however, are that he may be enabled:—

First. To make surface and underground surveys, and to map the same; also to map the topography and geology of a district.

Second. To analyze substances encountered on a mining property, to value and report upon the same; and to analyze metallurgical products.

Third. To make mining, metallurgical or other designs to meet the requirements of given cases, and to enter upon the construction and take charge of the same.

Fourth. To take upon graduation a subordinate position as an engineer in connection with any of the previously mentioned lines of work.

In the Freshman year the time is principally devoted to laying a thorough foundation in the fundamental subjects of English, Modern Languages, Mathematics and Physics, thus preparing the way for the technical and scientific studies of the following years. Lectures are given in Hygiene, and Gymnasium exercises under a competent director are required.

The course in Drawing begins, as soon as the student enters college, with freehand sketching of such objects as bear upon future work. Parallel with the preceding is taught Mechanical Drawing, in which course he learns the use of drawing instruments, makes tracings and blue prints, solves problems in Descriptive Geometry, and in the Sophomore year makes drawings

of machine parts of simple construction. In Metallurgical Construction he becomes familiar with metallurgical plant by making sketches and drawings of the same.

The Summer Schools in Land, Topographic, Mine and Railroad Surveying, of four weeks each,—given at the close of the Freshman, Sophomore and Junior years respectively,—enable the student to concentrate his energies upon each subject and the practical operations therein involved. The last of these three schools is conducted partly in the mining regions and not only gives him practice in mine and railroad surveying, but enables him to study mining operations and mining plant from which data is obtained exemplifying class room work as well as facilitating that in Mining Design.

The course in Chemistry extends from the first term of the Freshman year to the middle of the Junior year. It begins with an introduction to general chemical theory and the elements,—supplemented by laboratory work; the subject is continued by qualitative and quantitative analyses and assaying; chemical problems and reactions are taught under Stoichiometry. The instruction includes the analysis, by standard methods, of common ores, fuels, gases and metallurgical products.

In Crystallography the student handles accurately made models of crystals. He is thereby introduced to Mineralogy which follows; carefully selected mineral specimens are thoroughly studied and the various means of identification are applied to more difficult types, the determination of which may be assisted and effected by Blowpipe Analysis.

Biology, besides giving an excellent training in the study of animal life, assists greatly in the study of Historical Geology; the study of living organisms, their structure, development, origin and distribution, is taken up in this course.

In the courses in Geology he learns the forms and structures of the rock masses of the earth's crust, and the forces which operate upon them. A brief review of historical geology follows, dealing with the fossil life of the earth and its application to the determination of the age of strata. Practice in Field Geology teaches him the methods by which rock formations are accurately mapped. Economic Geology treats of the formation of cavities in rocks and their relation to ore deposits, together with the manner in which the ores have been deposited:—the structure, geographical horizon and distribution of the principal metallic and non-metallic deposits are then taken up.

The course in Petrology in the Junior year enables the common rock forming minerals to be readily identified by means of the microscope, especially when the constituents are too fine grained to be determined by the eye alone. The grouping of these minerals into rock textures is then taken up and by laboratory and field practice the student learns to recognize the main types of rocks.

In Boilers and in Steam and Gas Engines the common types and accessories are fully treated; work in the Engineering Laboratory enables complete tests to be made upon the same, and their efficiencies and powers under varying conditions are calculated.

A thorough course in Strength of Materials treats of the theory and practice which govern the elasticity and strength of all forms of common materials which are used in constructions. Methods of computing and designing beams, columns, shafts, etc., and practical work in the testing laboratory are prominent features of this course. Hydraulics treats of the flow of water through orifices, mains, pipes and channels, and also of the principles of hydraulic motors.

The course in Graphic Statics gives the student the ability to analyze the forces which exist in roof trusses, beams and girders by the graphical method, while that in Mechanics of Machinery enables him to apply the same method to the determination of the direction and magnitude of all the forces acting in a machine.

The instruction in Mining Engineering is given in a series of courses which extend over the entire Junior and Senior years, under the following subdivisions: The subject of Ore-Dressing treats of the processes by which ores or fuels, direct from the mine, are rendered marketable. Prospecting, boring, mining, haulage and hoisting, drainage, ventilation, lighting and accidents treat of the steps by which minerals are discovered and valued, the manner in which they are extracted from the earth and brought to the surface, the means by which mines are maintained in an economical condition both from the standpoint of the mine owner and that of the miner, and finally the manner in which accidents may occur, the means for guarding against the same, and the treatment of injured persons.

Mine Construction and Mine Administration treat respectively of the materials used in roads and structures in and around mines, and of the methods of employing labor, keeping accounts, and of management.

In Metallurgy, the general principles of the subject, embracing fuels, furnaces, and processes, are thoroughly presented, followed by the metallurgy of iron and steel, copper, lead, silver, gold, zinc, mercury, and aluminum. Electrometallurgy familiarizes the student with the practical applications of electricity to metallurgical processes.

Electrotechnology, extending over the entire Senior year, embraces the study of the industrial applications of electricity which are of particular value to the mining engineer, and includes work in the Dynamo Laboratory.

In Mining and Metallurgical Design the student embodies the foregoing principles and makes designs and working drawings of plant to fulfill given conditions.

A course in Spanish for the benefit of those who purpose practicing their profession in Spanish-speaking countries, is offered as an extra study during the Senior year. It is a required study in the Geological Alternative.

The facilities for exemplifying the work of the course are almost unequalled. Numerous cement, slate and other quarries, ore and coal mines, are within easy distance, while in the same town are the great works of the Bethlehem Steel Co. and the spelter and oxide works of the New Jersey Zinc Co.

Graduates in this course receive the degree of Engineer of Mines (E.M.).

THE COURSE IN MINING ENGINEERING.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Mathematics, (5)	143,144,145	Mechanics, (5)	142
Chemistry, (2)	390	Physics, (2)	320
Chemical Laboratory, (2)	391	Physical Laboratory, (1)	321
German, (3)	94	Qualitative Analysis, (3)	393
or French, (3)	74	Stoichiometry, (1)	394
Freehand Drawing, (1)	155	Mechanical Drawing, (1)	311
Mechanical Drawing, (3)	311	German *or* French, (3)	95 *or* 75
English, (3)	120, 121, 125	English, (2)	122, 125
Gymnasium, (2)	440	Gymnasium, (2)	440

SUMMER TERM.

Land Surveying, 163.

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Geometry, (5)	146	Calculus, (5)	147
Physics, (3)	322	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
Crystallography, (2)	240	Mineralogy, (3)	241
Quantitative Analysis,(3)	397	Blowpipe Analysis, (1)	243
Quant. Anal. Conf., (1)	398	Quantitative Analysis,(3)	401
Metallurgical Constr., (3)	251	Quant. Anal. Conf., (1)	402
Drawing and Design, (2)	312	Drawing and Design, (3)	312
Public Speaking, (1)	139		

SUMMER TERM.

Topographic Surveying, 164.

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Ore Dressing, (3)	309	Mining Engineer'g,(5)	300-303
Geology, (3)	272	Metallurgy, (5)	253
Assaying, (3)	412	Geology, (2)	273
Boilers, (1)	203	Petrology, (1)	280
Strength of Materials, (4)	171	Steam Engine, (3)	205
Petrology, (2)	279	Hydraulics. (3)	175
Blowpipe Analysis, (1)	244	Economics, (1)	21
Biology, (3)	292		
Economics, (1)	20		

SUMMER TERM.

Mine Surveying and Railroad Surveying, 310.

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Mining Eng., (5)	304-307	Mining Design, (4)	313
Metallurgy, (4)	255	Mine Administration, (1)	308
Electrotechnology, (2)	371	Metallurgical Design, (2)	252
Dynamo Lab., (1)	355	Electrometallurgy, (1)	258
Mech. of Machinery, (2)	207	Electrotechnology, (2)	378
or Gas Engines, (2)	230	Dynamo Laboratory, (1)	356
Graphic Statics, (2)	172	Economic Geology, (3)	274
Engineering Lab., (1)	221	Engineering Lab., (1)	222
Field Geology, (2)	278	Thesis, (3)	314

The figures in parentheses indicate the number of exercises per week.

GEOLOGICAL ALTERNATIVE IN THE COURSE IN MINING ENGINEERING.

The object of this alternative is to meet the recent demand of certain branches of mining engineering for additional training in geology and allied subjects.

The work of the mining engineer has of late years become divided into two rather distinct lines of work; in the one the engineer is essentially a resident engineer and remains in one general locality; in the other character of work he is especially concerned with mine examinations, reports on mining properties, etc., and travels about, remaining in a single locality only sufficiently long to thoroughly understand the geological features and the facilities which a property offers for development.

The resident mining engineer is called upon to superintend the operations of ore extraction and treatment and to generally direct the actual mining. His work, while it requires a very thorough knowledge of geology in order that he may be capable of conducting the underground development of the property, is more especially concerned with the mechanical and civil engineering features of the work, such as the construction of mine plant, tipples, head-frames, equipment for ore extraction, cheapest methods of mining, ore dressing, treatment, etc. This is especially true of engineers employed in eastern coal regions or localities where geological features are either simple or so thoroughly worked out and described as to offer no problems of especial difficulty.

On the other hand, to the mining engineer who is chiefly occupied in the valuation of prospective mining properties or is called upon to superintend or open up deposits in remote localities, geology becomes a subject of paramount importance. An additional training in the geological examination of ore deposits is absolutely essential. A thorough knowledge of all available sources of published information on all parts of the country, and a working knowledge of structural features, distribution of geologic formations and general geological features of the North American continent are necessary.

There has been in addition to this kind of work, an increasing demand for a class of mining engineers usually designated as mining geologists, who shall be especially occupied in the detailed working out of the geological features of mining properties. Such men are now frequently retained as resident engineers in

the employ of large mining companies, as well as by exploration companies in different parts of the world.

The geological alternative is designed to meet these several demands for the geological mining engineer. For the first two years the work in the courses is identical; in the Junior year the change is slight, being confined to an increase in petrographic study and in physiography during the second term; in the Senior year the study of the geology of North America and that of applied palaeontology are substituted for certain subjects given in the regular course. By means of these particular studies the engineer is trained in the thorough knowledge and understanding of the geological structure, distribution of rocks, and physiographic features of North America. He becomes familiar with the literature of geology, prepares plates and maps illustrating the areas covered by all principal geological surveys, and is in possession of the latest information of a geological nature on any part of the American possessions to which he may be called.

These courses are designed to be as little divergent as possible in view of the requirements, so that the training in either one of the alternatives, while preparing a man more specifically for one branch of the work, will not prevent him from undertaking the other with success.

GEOLOGICAL ALTERNATIVE.

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Ore Dressing, (3)	309	Mining Eng., (5)	300-303
Geology, (3)	272	Geology, (2)	273
Assaying, (3)	412	Metallurgy, (5)	253
Strength of Materials, (4)	171	Petrology, (2)	280, 281
Petrology, (2)	279	Hydraulics, (3)	175
Blowpipe Analysis, (1)	244	Physiography, (2)	277
Biology, (3)	292	Economics, (1)	21
Economics, (1)	20		

SUMMER TERM.

Mine Surveying, 310.

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Mining Eng., (5)	304-307	Mine Administration, (1)	308
Metallurgy, (4)	255	Mining Design, (2)	313
Electrotechnology, (2)	371	Economic Geology, (3)	274
Dynamo Lab., (1)	355	Electrotechnology, (2)	378
Graphic Statics, (2)	172	Dynamo Laboratory, (1)	356
Field Geology, (2)	278	Geology of N. America, (3)	276
AppliedPalaeontology, (2)	275	Spanish, (2)	110
Spanish, (2)	110	Thesis, (3)	314

THE COURSE IN ELECTRICAL ENGINEERING.

The object of this course is, first, to give a broad education in general and scientific subjects, and second, to give training in those special studies which are of most value in the equipment of the electrical engineer. The course includes a number of special studies in civil, mechanical and metallurgical engineering, and the graduate in Electrical Engineering is prepared, by the broad technical training which the course offers, not only to enter any of the branches of electrical engineering, but also to deal with the related problems in mechanical engineering, civil engineering, and metallurgical engineering.

The fundamental studies in mathematics, physics, chemistry, and language, including English, are given in the early part of the course. These subjects include the more essential features of a broad education, and they furnish a preparation for the more advanced scientific and technical training to follow.

Electrotechnical work, begun early in the course during the summer term at the end of Freshman year, is continued through the Sophomore year in the study of Electric Wiring, and Dynamos and Motors, (with Dynamo Laboratory). The Junior and Senior years are devoted almost exclusively to advanced technical work. Two terms of Economics are required during the Junior year.

The study of Electricity and Magnetism during the first term of the Sophomore year constitutes an introduction to the industrial applications of electricity.

The subject of Electric Wiring, begun the first term of Sophomore year, makes immediate application of electrical theory to the calculation of lighting and power circuits, the testing of insulation resistance, and similar problems. This study also includes the installation and wiring of electrical machinery, systems of electric distribution, outside and interior wiring, and the rules for wiring prescribed by the Fire Insurance Companies.

The study of Dynamo Electric Machinery is begun the second term of the Sophomore year, and includes electrodynamics, the construction, operation, and testing of direct current generators and motors, with numerous illustrative problems. This subject is continued during the first term of Junior year and is resumed during the first term of the Senior year under the name Alternating Current Machinery, which deals with alternators, single-

phase and polyphase motors, synchronous converters, transformers, and other apparatus.

The following special subjects in Mechanical Engineering are required in this course: Machine Design, begun in the first half of the Sophomore year, is continued for one year. Constructive Elements of Machinery is given in the summer term at the end of the Freshman year in conjunction with the work in Constructive Elements of Electrical Apparatus. Boilers, given during the first term of the Junior year, is followed by Steam Engine, during the second term of the Junior year. Mechanical Technology is given in the summer term at the end of the Sophomore year. This is a course in shop instruction intended principally to familiarize the student with the processes involved in pattern-making, moulding, forging, fitting and finishing. Frequent visits of inspection are made to manufacturing establishments in the vicinity. Following the work in Mechanical Technology, the study of Mechanics of Machinery and Machinery of Transmission is pursued during the Junior year, the latter study being elective during the second term. Engineering Laboratory is given throughout the Senior year. It includes the calibration of engineering measuring instruments and the performance of practical tests on boilers, engines, and pumps.

The following special studies in Civil Engineering are included in this course: Construction is given throughout the Junior year, consisting of lectures on masonry, foundations, cements and mortars, walls, dams, arches, tunnels, and details of structures; Strength of Materials, given in the first term of the Junior year, is concerned with the theory of beams, columns and shafts, and the methods of computing and designing them; the subject includes practical work in the testing laboratory; Hydraulics, given in the second term of the Junior year, treats of hydrostatics and theoretical hydraulics, the flow of water through orifices, weirs, pipes, and channels, naval hydromechanics, and hydraulic motors. Land Surveying may be taken as an option in the second term of the Junior year.

The study of general Metallurgy and Metallurgy of Iron and Steel is elective during the second term of the Junior year. Lectures given one hour per week on Theory of Electrolysis and Electrometallurgy may be taken as extras during the Senior year.

The special studies in Electrical Engineering which come after Electric Wiring, Dynamos and Motors, and Electricity and Magnetism of the Sophomore year include the following:

Advanced Theory of Electricity and Magnetism, begun in the first term of the Junior year, is devoted to the theory of electrical units and measurements, and to the advanced theory of electrostatics and the magnetism of iron. The accompanying laboratory work is devoted to precise electrical measurements, and the standardization and calibration of electrical measuring instruments. The Theory of Alternating Currents is also begun with the Junior year and is pursued up to the middle of the Senior year; this subject deals with the problems and methods of measurement which are peculiar to the modern practical applications of alternating currents, and with the theory underlying the action of the important types of alternating current machinery and transmission lines.

The subject of Electrical Engineering, beginning in the second term of the Junior year and following as it does the study of Dynamo Electric Machinery, deals with the distribution and utilization of electric power, comparison of systems, feeder regulation, arc and incandescent lighting, and photometry.

Dynamo laboratory work, beginning in the second term of the Sophomore year, is continued for five terms. The instruction given by a Laboratory Manual is supplemented by individual direction and supervision in the laboratory. The students work individually or in pairs, and make a large number of actual tests on direct and alternating current generators and motors, rotary converters, transformers, and other electrical apparatus. Carefully written reports of all tests made, with curves plotted from the observations, and discussion of results, are required.

Dynamo Electric Machinery, as already stated, is continued from the Sophomore year through one term of each of the Junior and Senior years. Special attention is paid to the application of electric and magnetic theory to the construction and operation of different types of direct and alternating current machinery.

The Electrical Engineering Seminary continues throughout the Senior year. The work consists of the presentation before the class of papers on assigned topics, supplementing the regular work of the class-room, and of reports on thesis work. The Department reading-room is well supplied with the leading electrical periodicals, American and foreign, and one of the principal objects of the Seminary work is to encourage the systematic reading of the current engineering journals. Reports on articles in the technical French and German periodicals are included as part of the work of the Seminary.

Dynamo Testing is given by lectures and problems beginning with the second term of the Junior year, and continuing through the first term of the Senior year. It treats of standard and special methods of making commercial tests on dynamo machines, transformers, and other electrical apparatus. Most of the methods discussed in the lectures are exemplified by the practical testing done in the dynamo laboratory.

Electric stations, given in the first term of the Senior year, constitutes an extension of the preliminary work given as Electrical Engineering during the second half of the Junior year. Under this subject are discussed the location, design, and equipment of stations; the selection of suitable prime movers, generators, switchboards, and other apparatus. The use and operation of storage batteries, boosters and other auxiliaries, also receive consideration.

Electric Traction and Power Transmission are both given during the second term of the Senior year. Under Electric Traction are studied the construction, equipment and operation of different types of electric railways. The recent developments in the application of electric motive power to steam railroad conditions are discussed, and the results of tests analyzed. Practice is given in the estimating of the probable cost of building and operating an electric railway to fulfill certain specific conditions.

The subject of Electric Power Transmission deals with the various elements constituting a transmission system. It includes a study of the generating plant, the transmission line, and the receiving systems. Special attention is given to the design, construction, and protection of the line. Under the last three subjects are included visits of inspection to electric light and power stations, and to manufacturing establishments in the Bethlehems and out of town. Central station tests are made and reports required.

Electrical Design is begun in the first term of the Senior year and is pursued throughout the year. The work consists of a series of problems illustrating the application of electromagnetic laws to the calculation and proportioning of electrical machinery for a specified duty. Each student makes complete calculations and drawings for several types of apparatus, including electromagnets, direct and alternating current generators and motors, and transformers. The study of electrical design is intended to reënforce by concrete application the principles underlying the study of dynamo electric machinery.

Graduates receive the degree of Electrical Engineer (E.E.).

THE COURSE IN ELECTRICAL ENGINEERING.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Geometry, (6)	146	Calculus, (6)	147
Chemistry, (2)	390	Physics, (2)	320
Chemical Laboratory, (2)	391	Physical Laboratory, (1)	321
German, (3)	94	Qualitative Analysis, (3)	393
or French, (3)	74	Stoichiometry, (1)	394
Freehand Drawing, (1)	155	German, (3)	95
English, (3)	120, 121, 125	*or* French, (3)	75
Gymnasium, (2)	440	English (2)	122, 125
		Gymnasium, (2)	440

SUMMER TERM.

Constructive Elements of Machinery and of Electrical Apparatus, 201, 350.

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Mechanics, (4)	142	Analytic Mechanics, (2)	148
Physics, (3)	322	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
Draw'g and Mach. Des., (3)	200	Machine Design, (3)	202
Electric Wiring, (1)	351	Dynamos and Motors, (3)	352
French, (3)	70	Dynamo Laboratory, (1)	353
or German, (3)	90	French, (2)	71
English, (2)	123, 126	*or* German, (2)	91
Public Speaking, (1)	139	English, (2)	124, 126

SUMMER TERM.

Mechanical Technology, 206.

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Theory of Alt. Cur., (2)	357	Electrical Engineer'g, (1)	361
Elec. and Magnetism, (2)	327	Dynamo Testing, (1)	366
Dynamo Elec. Mach'y, (2)	358	Theory of Alt. Cur., (2)	360
Dynamo Laboratory, (1)	359	Electrical Laboratory, (1)	329
Electrical Laboratory, (1)	328	Dynamo Laboratory, (1)	363
Boilers, (1)	203	Hydraulics, (3)	175
Strength of Materials, (4)	171	Construction, (2)	168
Mech. of Machinery, (2)	207	Steam Engine, (3)	205
Construction, (2)	167	Economics, (1)	21
Economics, (1)	20	Mech. of Mach., (3)	211
		or Metallurgy, (3)	254
		or Land Surveying, (3)	163

SUMMER TERM.

Electrical Engineering Inspection, 379.

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Theory of Alt. Cur., (3)	364	Electrical Design, (3)	372
Alt. Current Mach., (3)	365	Power Transmission, (3)	374
Electrical Design, (2)	368	Electric Traction, (3)	373
Electric Stations, (2)	369	Dynamo Laboratory, (2)	376
Dynamo Laboratory, (2)	367	Engineering Lab., (1)	222
Dynamo Testing, (1)	366A	Electrical Seminary, (1)	375
Electrical Seminary, (1)	370	Thesis, (4)	380
Engineering Lab., (1)	221		
Advanced Elec. Lab., (1)	338		
Business Law, (1)	24		

The figures in parentheses indicate the number of exercises per week.

THE COURSE IN CHEMISTRY.

This course of study is designed to prepare students for the profession of the chemist, in connection with metallurgical establishments, sugar refineries, gas works, manufacturing works, chemical plants, electrical machinery manufactories, mining companies, etc., and the general consulting and analytical work of the professional chemist. It is also well adapted to the preparation of teachers of chemistry and as a course preliminary to the study of medicine.

Instruction in Theoretical Chemistry is begun in the first term of the Freshman year, with laboratory work in general inorganic chemistry. Stoichiometry, with practice in chemical problems, is taught in the second term of the Freshman year and is followed in the Sophomore year by Chemical Philosophy and Advanced Chemistry. In the second term of the Junior year there is a course of lectures and recitations on Organic Chemistry, with laboratory work.

Qualitative Analysis is taught by lectures and laboratory work in the Second term of the Freshman year. This is followed by courses in Quantitative Analysis throughout the Sophomore and first term of the Junior year. This course includes Gas Analysis. Furnace Assaying and the assay of gold and silver bullion are taught in the first term of the Senior year by lectures and laboratory work. The analysis of various commercial products is taken up in the second term of the Senior year, also the subject of Sanitary Chemistry. Instruction is also given in manufacturing Chemistry, Dyeing, Calico Printing, and Bleaching. Blowpipe Analysis also is included in the course.

The practical work in Organic Chemistry is performed in the second term of the Junior year in the organic laboratory. Physical Chemistry is taught by text-book and laboratory work. In the Senior year the student prepares a thesis on some chemical subject, involving laboratory work.

The laboratory for qualitative analysis is a large, well-ventilated, and well-lighted room, supplied with convenient working tables, vacuum filtration, hoods for noxious vapors, steam baths, gas and washing appliances, and a commodious room for hydrogen sulphide. Distilled water is delivered by faucet in this room and other large laboratories.

The quantitative laboratory is equipped like the qualitative laboratory, but is supplied in addition with apparatus for drying precipitates and residues, rooms for the chemical balances, for combustions, and for a reference library.

The gas laboratory is supplied with full and complete apparatus for gas analysis, according to Orsat's, Hempel's, and Bunsen's processes.

The assaying laboratory is supplied with large working tables, twenty-nine crucible and two iron furnaces, and eight muffle furnaces, with adjoining rooms for balances, and gold and silver bullion analysis.

The laboratory for organic chemistry is equipped similarly to the quantitative laboratory, in addition being supplied with high pressure steam, cold water and air blast upon the working tables, and a full supply of apparatus for the various determinations and experiments, including combustion furnaces, furnaces for heating sealed tubes, Hoffman's, Dumas's, and Meyer's apparatus for vapor densities, nitrometers, chemical balances, etc.

The working laboratories for industrial chemistry contain an apparatus for making illuminating gas, an alcohol still, worm and doubler, and a complete working model of a sugar refinery, including filters, vacuum pan, and centrifugal. There is also apparatus for use in the manufacture of chemicals, for dyeing, calico printing, and bleaching. In connection with these laboratories is a room containing a photometer and apparatus for determining the sulphur, ammonia, and specific gravity of illuminating gas; also a laboratory for the testing of alcoholic liquors, sugar, molasses, bone black, soap, petroleum, paints, dyes, superphosphates, tallow, illuminating and lubricating oils, rubber, explosives, asphalts, and other commercial products, with the necessary technical apparatus. The students make practical experiments in this direction, and, with an instructor, visit various industrial establishments in this neighborhood, in Philadelphia and New York City. Bacteriology includes a course of lectures and laboratory work.

Graduates in this course receive the degree of Bachelor of Science (B.S.) in Chemistry.

THE COURSE IN CHEMISTRY.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Geometry, (6)	146	Calculus, (6)	147
Chemistry, (2)	390	Qualitative Analysis, (3)	392
Chemical Laboratory, (2)	391	Stoichiometry, (1)	394
German, (3)	94	Physics, (2)	320
or French, (3)	74	Physical Laboratory, (1)	321
Freehand Drawing, (1)	155	German, (3)	95
English, (3) 120,	121, 125	*or* French, (3)	75
Gymnasium, (2)	440	English, (2) 122,	125
		Gymnasium, (2)	440

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Mechanics, (4)	142	Physics, (3)	325
Chemical Philosophy, (3)	395	Physical Laboratory, (1)	326
Quantitative Analysis, (5)	396	Quantitative Analysis, (7)	400
Quant. Anal. Conf., (1)	398	Quant. Anal. Conf., (2)	402
Physics, (3)	322	Advanced Chemistry, (3)	403
Physical Laboratory, (1)	324	Blowpipe Analysis, (1)	243
English, (2) 123,	126		

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
*Quantitative Analysis, (6)	405	Organic Chemistry, (4)	409
Quant. Anal. Conf., (2)	407	Organic Chem. Lab., (4)	410
Physical Chemistry, (3)	417	Metallurgy, (5)	253
Physical Chem. Lab., (1)	418	Mineralogy, (3)	241
Crystallography, (2)	240	Economics, (1)	21
Economics, (1)	20		
Blowpipe Analysis, (1)	244		

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Metallurgy, (4)	255	Industrial Chemistry, (3)	413
Assaying, (3)	412	Industrial Analysis, (3)	414
Industrial Chem. Lab., (3)	411	Indus. Anal. Conf., (1)	415
Bacteriology, (2)	296	Sanitary Chem. Lab., (3)	416
Geology, (3)	272	Geology, (2)	273
Theory of Electrolysis, (1)	257	Electrometallurgy, (1)	258
Electromet. Lab., (1)	259	Electromet. Lab., (1)	259
		Thesis, (3)	421

The figures in parentheses indicate the number of exercises per week.

*Optional courses in Advanced Quantitative Analysis will be offered from year to year to students properly qualified. For 1908-1909 the courses embrace the analysis of Ferro-alloys and the analysis of complex copper slimes.

THE COURSE IN CHEMICAL ENGINEERING.

This course of study is designed to prepare students for the profession of the chemical engineer, engaged in the construction and management of manufacturing establishments involving chemical principles, such as sugar refineries, gas works, superphosphate works, bleacheries, dye works, oil refineries, fertilizer works, soap works, sulphuric acid plants, soda works, chemical plants, metallurgical works, etc.

In addition to many of the subjects in the Course in Chemistry, it includes the subjects of boilers, steam engine, drawing and machine design, constructive elements of machinery, measurement of power, mechanics of machinery, mechanical technology, and work in the engineering laboratory. It also includes electricity and magnetism, dynamos and motors, and work in the electrical and dynamo laboratories.

In this course the training is essentially chemical and the graduates are primarily chemists with a good knowledge of mechanical and electrical engineering.

This equipment is considered more valuable for the chemical engineer than a fundamental training in engineering and a somewhat limited knowledge of chemistry, since the problems of the manufacturing chemist are not essentially mechanical ones. Although six years' work covering most of the studies of both the chemical and mechanical courses would be found advantageous for the chemical engineer, this shorter course, of four years, will be found to meet most of his requirements.

Graduates of this course receive the degree of Chemical Engineer (Ch.E.).

THE COURSE IN CHEMICAL ENGINEERING.

FRESHMAN YEAR.

FIRST TERM.		SECOND TERM.	
Analytic Geometry, (6)	146	Calculus, (6)	147
Chemistry, (2)	390	Physics, (2)	320
Chemical Laboratory, (2)	391	Physical Laboratory, (1)	321
German, (3)	94	Qualitative Analysis, (3)	393
or French, (3)	74	Stoichiometry, (1)	394
Freehand Drawing, (1)	155	German, (3)	95
English, (3)	120, 121, 125	*or* French, (3)	75
Gymnasium, (2)	440	English, (2)	122, 125
		Gymnasium, (2)	440

SUMMER TERM.

Constructive Elements of Machinery and of Electrical Apparatus, 201, 350.

SOPHOMORE YEAR.

FIRST TERM.		SECOND TERM.	
Mechanics, (4)	142	Advanced Chemistry, (3)	403
Chemical Philosophy, (3)	395	Quantitative Analysis, (4)	401
Quantitative Analysis, (3)	397	Steam Engine, (4)	204
Quant. Anal. Conf., (1)	398	Machine Design, (3)	202
Physics, (3)	322	Physics, (3)	325
Physical Laboratory, (1)	324	Physical Laboratory, (1)	326
English, (2)	123, 126		
Draw. and Mach. Des., (3)	200		

SUMMER TERM.

Mechanical Technology, 206.

JUNIOR YEAR.

FIRST TERM.		SECOND TERM.	
Quantitative Analysis, (4)	408	Organic Chemistry, (4)	409
Engineering Lab., (2)	208	Organic Chem. Lab., (4)	410
Elec. and Magnetism, (2)	327	Metallurgy, (5)	253
Electrical Laboratory, (1)	328	Engineering Lab., (1)	209
Dynamos and Motors, (2)	354	Electrical Eng., (2)	362
Physical Chemistry, (3)	417	Electrical Laboratory, (1)	329
Physical Chem. Lab., (1)	418	Dynamo Laboratory, (1)	356
Boilers, (1)	203		
Dynamo Laboratory, (1)	355		

SUMMER TERM.

Engineering Laboratory, 212.

SENIOR YEAR.

FIRST TERM.		SECOND TERM.	
Industrial Chem. Lab., (3)	411	Industrial Chemistry, (3)	413
Assaying, (3)	412	Industrial Analysis, (3)	414
Metallurgy, (4)	255	Indus. Anal. Conf., (1)	415
Bacteriology, (2)	296	Sanitary Chem. Lab., (3)	416
Engineering Lab., (1)	220	Electrometallurgy, (1)	258
Mech. of Machinery, (2)	207	Electromet. Lab., (1)	259
Economics, (1)	20	Economics, (1)	21
Theory of Electrolysis, (1)	257	Thesis, (3)	421
Electromet. Lab., (1)	259		

The figures in parentheses indicate the number of exercises per week.

GRADUATING THESES.

Every student is required to present a thesis upon some topic connected with the course from which he is to graduate, as a necessary portion of the exercises for his final examination for a degree. These theses are accompanied by drawings and diagrams, whenever the subjects need such illustration. The originals will be kept by the University, as a part of the student's record, for future reference; but a copy may be retained by the student, and be published, permission being first obtained from the Faculty.

DIPLOMAS AND CERTIFICATES.

The Diploma is given only to those who have passed all the examinations in a regular course and is signed by the Secretary of the Board of Trustees and by the Faculty of the University. For all the partial courses a certificate is given, signed by the Secretary of the Faculty, and showing what the student has accomplished.

THE UNIVERSITY MUSEUMS.

The University Museums include large collections illustrating various branches of Chemistry, Metallurgy, Geology, Mineralogy, Zoölogy and Archaeology.

The Metallurgical Cabinet includes specimens illustrating the various processes for obtaining the more common metals.

The Zoölogical Cabinet includes the Werner collection of nearly all the types of American birds with their nests and eggs, and the Packer collection of recent shells.

The Geological Museum is located in the west end of Williams Hall, and contains collections of fossils, specimens of ore from mining districts, and extensive series of rocks which illustrate the type occurrences in different parts of the world. There is also a duplicate set of the rocks collected by the Second Geological Survey of Pennsylvania.

The Cummings Archaeological Cabinet has three thousand specimens and includes Dr. Stubb's collection of Indian relics, weapons, and utensils.

UNIVERSITY LECTURES.

From time to time during the University year, distinguished members of the various professions are invited to lecture before the students upon those special subjects to which they have given particular attention and upon which they are authorities.

The following lectures were given in this course during the years 1906-1907 and 1907-1908:

Mr. J. W. Smith, "An Outline Description of the Additional Water Supply of the City of New York."

Dr. W. R. Brooks, "The Evening and Morning Stars."

Dr. Talcott Williams, "The Corporation Problem."

Mr. H. W. DuBois, "Alaska, Our Land of the Midnight Sun."

Mr. W. B. Snow, "The Creation of a Manufacturing Plant."

Mr. E. J. Prindle, "Patents as Affecting the Young Engineer."

Dr. W. H. Wiley, "The Service of Science to the State."

Dr. W. L. Estes, "The Modern Science of Prevention."

Mr. F. L. Waldo, "Civil Service Reform."

Prof. R. W. Wood, "Modern Air Ships and Flying Machines."

Bishop Leighton Coleman, "Some Out-of-the-Way Experiences."

Prof. L. P. Breckenridge, "Coal and its Economic Utilization."

Prof. C. S. Smith, "American Citizenship."

Dr. R. W. Raymond, "Geology, and its Influence upon the History of Jamaica."

Bishop Ethelbert Talbot, "Life among the Cowboys and Miners of the Rockies."

Mr. H. W. DuBois, "British Columbia."

Mr. E. Stütz, "Alumino Thermics."

THE CHEMICAL SOCIETY.

This Society was organized in the fall of 1871.

The collections of botanical and zoölogical specimens belonging to the Society are important. During the past years persons have been sent to Texas and Brazil to collect specimens for these cabinets.

THE ENGINEERING SOCIETIES.

The original Engineering Society was organized in 1873 and was open to all technical students of the University. From 1885 to 1890 it issued quarterly five volumes of "The Journal of the Engineering Society of Lehigh University," containing contributions by the members, alumni, and others. Many of the papers

read before this Society from 1890 to 1893 were published in "The Lehigh Quarterly."

In 1900 the Civil Engineering and Mechanical Engineering students formed independent societies. The Electrical Engineering Society, founded in 1887, was reorganized in 1901. Later the Metallurgical Society and the Mining and Geological Society were formed. All these Societies hold monthly meetings for the reading and discussion of papers relating to the subjects of their particular departments.

THE ARTS AND SCIENCE CLUB.

This society was organized in the fall of 1905. Its object is to supplement the routine class-room work of the School of General Literature by the reading and discussion of papers on topics of varied interest. Discussions are led from time to time by members of the Faculty and addresses are made by scholars from outside the University.

CIRCULO IBERO-AMERICANO DE LA UNIVERSIDAD DE LEHIGH.

This club was organized in February, 1906, by the Spanish-American students of the University for literary purposes and for mutual help of the members in the pursuit of college work.

THE Y. M. C. A. OF THE UNIVERSITY.

This is a voluntary organization of the students for the promotion of the religious, moral, and social life of the University. It was organized April 18, 1890, and on October 11, 1890, united itself with the Intercollegiate Young Men's Christian Association. The movement is distinctly for and by students, all the officers, with the exception of the General Secretary, a college graduate, being chosen from the student-body.

FOUNDER'S DAY.

On the second Thursday of October of each year, Commemorative Exercises are held in honor of the Founder of the University. On Thursday, October 10, 1907, the twenty-eighth Founder's Day was celebrated. An address was delivered by Dr. William H. Nichols, of New York, N. Y.

UNIVERSITY SERMON.

This sermon is preached on the Sunday before University Day. The Rt. Rev. Cortlandt Whitehead, D.D., S.T.D., Bishop of Pittsburg, was the preacher on Sunday, June 9, 1907, in the Packer Memorial Church.

THESES.

Theses on the following subjects were prepared by candidates for degrees in 1907.

FOR THE DEGREE OF MASTER OF ARTS.

GEORGE ROSEBERY STULL, B.A. (*Lehigh*), Ridley Park.
The Growth of the Temporal Power of the Papacy.

FOR THE DEGREE OF MASTER OF SCIENCE.

HIRAM DRYER MCCASKEY, B.S. (*Lehigh*), South Bethlehem.
Geology of the Iron Ore Deposits of Durham, Pa.

WILLIAM CLYDE WILLARD, C.E. (*Cumberland Univ.*), Norfolk, Va.
Economic Discussion of Change of Lehigh Valley Railroad Line Across Calypso Island.

FOR THE DEGREE OF BACHELOR OF ARTS.

ROLLIN LANDIS CHARLES, Allentown.
The Number System of Algebra.

ISADORE JAMES FREEDMAN, Philadelphia.
A Study of the Dielectric Strength of Various Materials.

RALPH JOHN GILMORE, Williamsport.
Local Distribution of Phanerogams, with Illustrative Herbarium.

RALPH WILHELM KINSEY, Reading.
Journalism in Small Cities.

HENRY JAMES PRECHTL, Elmira, N. Y.
Otto Ludwig and his Work.

JOSEPH BENSON REYNOLDS, New Castle.
An Investigation of the Temperature Compensation of the Pendulum of the Bond Sidereal Clock of Sayre Astronomical Observatory.

TRUMAN GROSS SCHNABEL, Bethlehem.
The Circulatory System in Vertebrates.

RAYMOND WADSWORTH WALTERS, Bethlehem.
Mental Heredity.

ROY BECK WOODRING, Allentown.
The Distribution of Wealth in Lehigh County.

FOR THE DEGREE OF CIVIL ENGINEER.

WILLIAM DREES AIKEN, Bethlehem.
Design of a Steel Concrete Arch.

HOWARD LEFFINGWELL BALDWIN, Allentown.
Flow of Lehigh River at Allentown, Pa.

HENRY CHARLES BECKER, Baltimore, Md.
Economic Design of Timber Trestles.

PAUL LORENZO BROOKE, Pottstown.
Determination of Latitude and Longitude of Nazareth, Pa.

ORLANDO WEATHERS BUMP, Baltimore, Md.
Improvement of Pavement of Fourth Street from Locust to Wyandotte Street, South Bethlehem, Pa.

ROBERT EMMETT CULLEN, Williamsport, Md.
Tests of Paving Brick.

CLAUDE MAHLON DANIELS, Pottstown.
Steel Structure of Office and Post Office Building, New York Central and Hudson River R.R., New York, N. Y.

ARTHUR ALBERT DAVIS, Bethlehem.
Change of Alignment, Lehigh and New England R. R.

WILLIAM ALBERT DRAPER, Washington, D. C.
Tests of Steel Concrete Beams.

AMBROSE JOSEPH FASENMYER, New Bethlehem.
Modulus of Elasticity of Timber in Tension and Compression.

GEORGE EDMUND FOX, Pittsburg.
Determination of Azimuths with Engineer's Transit.

EDGAR FREDERICK GOHL, Harrisburg.
Economic Proportions of Stone, Sand and Cement in Concrete.

MONTGOMERY JAMES GREENOUGH, Four Paths, Jamaica.
Tests of Paving Brick.

HENRY JOSEPH GROENINGER, Baltimore, Md.
Modulus of Elasticity of Timber in Tension and Compression.

CHARLES AARON GROSS, South Bethlehem.
Tests of Paving Brick.

FERDINAND EUGENE HAYES, JR., Louisville, Ky.
Discussion and Tests of Cements in Louisville District.

ROBERT ALEXANDER HOOKE, Chattanooga, Tenn.
Determination of Latitude and Longitude of Nazareth, Pa.

FREDERICK ROLAND HORNE, Plainfield, N. J.
Design of a Sewerage System for Plainfield, N. J.

FREDERICK GORDON HURST, Philadelphia.
Discussion of Bethlehem City Water Company and Filter Plant.

GILBERT GARFIELD JACOBOSKY, Wilkes-Barre.
Design of an Overhead Crossing for Market Street, Wilkes-Barre, Pa.

EARLE FREDERICK JOHNSON, Gracedale.
Effect of Lehigh Valley R. R. Cut-off on Flood Flow of Lehigh River.

REVERDY HAMLIN JONES, Norfolk, Va.
Effect of Lehigh Valley R.R. Cut-off on Flow of Lehigh River.

FRANK ULRICH KENNEDY, Carlisle.
Design of a Sewerage System for Carlisle, Pa.

GORDON EUGENE KENT, Rome, N. Y.
Standardization of Current Meter, and Determination of Flow of Lehigh River.

EDMUND GEDDES KING, Pottsville.
Discussion of Materials for City Pavements.

CLAIR MILLER LOUCKS, York.
Design of Water Supply System for York, Pa.

ROBERT MACMINN, Williamsport.
Standardization of Current Meter, and Determination of Flow of Lehigh River.

HAROLD AUSTIN MCINTOSH, Highland, Kans.
Design of Water Supply System for Bethlehem, Pa., from Camel's Hump Springs.

PHILIP OUTERBRIDGE MCQUEEN, Washington, D. C.
Economic Proportions of Stone, Sand and Cement in Concrete.

LAWRENCE BERT MYERS, Philadelphia.
Holding Force of Nails in Different Woods.

WILLIAM EDWARD NICHOLSON, Elmira, N. Y.
Design of a Plate Girder Bridge.

EVERARD LECOMPTE PATTISON, Baltimore, Md.
Tests of Steel Concrete Beams.

ROBERT STREETER PORTER, Wilkes-Barre.
Holding Force of Nails in Different Woods.

CLARENCE KNIGHT ROULSTON, Baltimore, Md.
Design of a 50,000 Gallon Reservoir in South Mountain Brook.

JOHN THOMAS ROWE, Hampton, Va.
Horizontal Velocity Curves in Rivers and Canals.

JOSEPH RALPH SCARLETT, Philadelphia.
Tests of Paving Brick.

MATTHEW LINCOLN SMITH, Mount Carmel.
Estimate of Cost of Lehigh Valley R. R. Cut-off at Calypso Island.

SHALER GORDON SMITH, Baltimore, Md.
Design of a Water Supply System for Bethlehem, Pa., from Camel's Hump Spring.

LEWIS THOMAS, New Castle.
Design of a Plant for the Purification of Sewage of New Castle, Pa.

SAMUEL HARRISON TILGHMAN, B.A., (*St. John's*), Annapolis, Md.
Comparison of Plate Girder with Pratt Truss Bridge for Span of 130 Feet.

GEORGE WASHINGTON LEROY TRAVIS, Flushing, N. Y.
Comparison of Pennsylvania and Baltimore Trusses of 200 Feet Span.

ERNEST BENJAMIN WALTON, Pocomoke City, Md.
Materials Used in Modern Building Construction.

CHESTER HARVEY WILCOX, Center Moriches, N. Y.
Change of Alignment, Lehigh and New England R. R.

FOR THE DEGREE OF MECHANICAL ENGINEER.

WALTER JACOB AMMER, Baltimore, Md.
Design of a 300 Brake Horse-Power Gas Engine.

CHARLES LUTHER BACHMAN, South Bethlehem.
Complete Test of Power Plant of R. K. Bachman & Bro.'s Planing Mill, Phillipsburg, N. J.

ROBERT ASHTON BAYARD, Washington, D. C.
Speed Regulation of Water Wheels.

RICHARD GUY BRINDLE (with E. F. Shaffer, jr.), Belleville.
Thermodynamic Test of a Gas Producer and Engine.

JOHN ANDRÉ BRODHEAD, Bethlehem.
Comparison of Wage-paying Systems.

ALFRED SHAFFNER DEHUFF, Lebanon.
Discussion of the Various Types of Centrifugal Pumps and the Service for which they are Suited.

HENRY DANIEL DESH, Bethlehem.
Boiler Test of Butztown Power House.

OLIVER ZELL HOWARD, Annapolis, Md.
A Good Vacuum and the Method of Obtaining the Same.

EDGAR PHILEMON HULSE, Washington, D. C.
Considerations Involved in the Handling of Material by Conveyors Affording Constant Delivery.

DAVID WILLIAM JARDINE, Newington, Ontario.
Design of a Pumping Station.

THOMAS MINOR LESHER, Easton.
The Design of a New Municipal Lighting Plant for the City of Easton, Pa., with an Estimate of its Cost.

JOHN GABRIEL LOOSE, Palmyra.
Conversion of the Indicator Diagrams of a Triple Expansion Engine with Corresponding Entropy Diagrams and Discussion of the Results.

EDWARD MARIUS MCNALLY, South Bethlehem.
Test of Boiler and Engine of the Pioneer Silk Co., South Allentown, Pa.

ROBERT UPTON PAUL MACKALL, Washington, D. C.
Efficiency Test of Steam Plant of the Palace Ribbon Co., South Allentown, Pa.

ALBERT JACOB MAYER, Johnstown.
Comparison of Alcohol and Gasoline Engines.

RODNEY AUGUSTUS MERCUR, JR., Towanda.
Design of a 25 Horse-Power Rotary Explosive Engine.

LEVIN ALEXANDER MOORE, Bethlehem.
Experimental Determination of the Chemical and Physical Constants of the Combustible Gases and their Products of Combustion under Working Conditions of the Gas Engine.

SAMUEL REA MORRIS, Pottstown.
An Investigation of the Problems of the Automobile, together with the Means Taken for their Solution.

PHILIP RAINEY ROPER, Petersburg, Va.
Test of Boiler and Engine at Lehigh Valley Silk Mills, South Bethlehem, Pa.

MARTIN HENRY SCHMID, Washington, D. C.
Dynamometers and Measurement of Power.

EDGAR SCHWEITZER, Bethlehem.
Boiler Test of Brodhead Power House.

JOHN DENNY SCOTT, Portland, Ore.
Experimental Determination of Combustion Temperatures in the Gas Engine.

ELMER FREDERICK SHAFFER, JR. (with R. G. Brindle), Philadelphia.
Thermodynamic Test of a Gas Producer and Engine.

MARTIN LUTHER HOFFA SMITH, Reading.
The Present Engineering Status of the Different Systems of Refrigeration.

HUGH EXTON STEELE, Baltimore, Md.
Comparison of Analytical and Graphical Methods in the Solution of Engineering Problems.

BRUCE MILTON SWOPE, Harrisburg.
Influence of Various Chemical Elements on the Physical Properties of Steel.

JOSEPH COLE UTLEY, Hammondsport, N. Y.
Investigation of Change from Engine to Motor Drive at the Cold-Roll Mill of the Crucible Steel Works, Jersey City, N. J.

RUDOLPH WALTER VOSSBERG, Bethlehem.
Test of the Gas Engine at the Gruber Silk Mill, Bethlehem, Pa.

IRA BENJAMIN WHEELER, JR., Elizabeth, N. J.
Test of Engine and Boiler of the Weilbach Silk Mill, Allentown, Pa.

FOR THE DEGREE OF ENGINEER OF MINES.

HARRY FRAZIER ANDERS, (with J. B. Carlock), Frederick, Md.
Some Experiments to Determine the Power Developed by a Rock-Drill.

RALPH S. ARCHIBALD (with H. P. Dyson), Washington, D. C.
The Relation of Ore Deposits to Igneous Intrusions.

JOHN BRUCE CARLOCK (with H. F. Anders), New York, N. Y.
Some Experiments to Determine the Power Developed by a Rock-Drill.

SAMUEL ERNEST DOAK, Philadelphia.
A Discussion of the "Law of the Apex."

CHARLES DORRANCE (with J. H. Farrell), Dorranceton.
The Geology of the Chestnut Ridge District near Easton, Pa.

HERBERT PANNEBECKER DYSON (with R. S. Archibald), New Providence.
The Relation of Ore Deposits to Igneous Intrusions.

JOHN HERBERT FARRELL (with C. Dorrance), Marquette, Mich.
The Geology of the Chestnut Ridge District near Easton, Pa.

JOHN FABER HANST (with C. T. Kriebel), Kingwood, W. Va.
Petrography and Origin of Certain Pre-Cambrian Gneisses of Southeastern Pennsylvania.

ALFRED WILLIAM HESSE, Wheeling, W. Va.
A Review of the Unwatering of the Consolidation Coal Co.'s Mines at Frostburg, Md.

CHARLES THEODORE KRIEBEL, (with J. F. Hanst), Allentown.
Petrography and Origin of Certain Pre-Cambrian Gneisses of Southeastern Pennsylvania.

WILLIAM R. MEYERS, Louisville, Ky.
The Effect of Barometric Pressure on Coal Mine Explosions.

LEDLIE DOMINICK MOORE, Chatham, N. J.
A Study of Coal Mine Pillars.

NATHANIEL RAMSAY PENNYPACKER, Haddonfield, N. J.
Investigation of the Geology of the Tonopah District, Nevada.

ANDREW CARNEGIE RAMSAY, Greensburg.
Review of the Ramsay Revolvable Car Dump.

WALTER ATWOOD THOMAS, Worcester, Mass.
A Study of Methods of Electric Signaling and Lighting in Mines.

JOSEPH TEMPLE WADDILL, Richmond, Va.
A Study of Blasting Powders.

FOR THE DEGREE OF METALLURGICAL ENGINEER.

GEORGE KUNKEL REEL, Harrisburg.
Radiation Losses from Furnaces, as Determined by the Fèry Radiation Pyrometer.

FOR THE DEGREE OF ELECTROMETALLURGIST.

GEORGE KURT HERZOG, Mickleton, N. J.
Electrolytic Metal Refining in Non-aqueous Electrolytes.

WARREN ALBERT QUADENFIELD, South Bethlehem.
Study of the Phenomena at Intermediate Electrodes.

FOR THE DEGREE OF ELECTRICAL ENGINEER.

GEORGE MILFORD BAKER, Hagerstown, Md.
An Experimental Study of Series Current Transformers.

JOHN WARFEL BEYER, A.B. (*Franklin and Marshall*), Lancaster.
The Predetermination and Construction of Reactance Coils.

WILLIAM WALTON CRAWFORD, Bloomfield, Neb.
An Investigation of and the Compensation for the Errors of Indicating Wattmeters.

WILLIAM LANE DEBAUFRE, Baltimore, Md.
Design of an Electric Lighting and Power System for Lehigh University.

CLARENCE LINCOLN EASTMAN, Waterville, N. Y.
Theoretical and Experimental Investigation of the Regulation of Alternators.

EDWARD STANIFORD FOSTER (with A. B. Grubmeyer), Bayhead, N. J.
Tests on the Running Conditions of the Slate Belt Electric Railway and Adjoining Systems.

ROULON JAMES GREEN (with J. C. Sandorf), West Chester.
An Experimental Study of a Motor-Generator Set.

AUGUST BERNARD GRUBMEYER (with E. S. Foster), Philadelphia.
Tests on the Running Conditions of the Slate Belt Electric Railway and Adjoining Systems.

ALFRED WILLIAM LAWSON (with J. I. Porter), Pottsville.
An Experimental Study of Methods of Measuring the Slip of Induction Motors.

JOSEPH IRVING PORTER (with A. W. Lawson), Wilkes-Barre.
An Experimental Study of Methods of Measuring the Slip of Induction Motors.

MANUEL TEOFILO SALDAÑA (with E. R. Treverton), San Juan, Porto Rico.
The Design, Construction and Test of a Synchroscope.

JOSEPH CHARLES SANDORF (with R. J. Green), South Bethlehem.
An Experimental Study of a Motor-Generator Set.

EDGAR RAYMOND TREVERTON (with M. T. Saldaña), Carlisle.
The Design, Construction and Test of a Synchroscope.

FOR THE DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY.

ROBERT LOUIS LAFFERRANDRE, Sayville, N. Y.
The Sanitary Investigation of the Milk Supply of South Bethlehem, Pa.

MALCOLM HENRY ULMAN, Williamsport.
The Action of Sulphuric Acid on Pig Iron.

UNIVERSITY DAY.

This day is the last of the academic year, and falls in 1908 on the second Wednesday in June. On this day orations are deliv-

ered by members of the graduating class, and degrees are conferred.

EXERCISES ON JUNE 12, 1907.

MUSIC.

PRAYER.

Salutatory Oration: "The Practical Age."
JOSEPH BENSON REYNOLDS.

MUSIC.

Oration: "Some Geographical Influences in American History."
TRUMAN GROSS SCHNABEL.

Oration: "The Popular Election of Federal Senators."
RAYMOND WADSWORTH WALTERS.

MUSIC.

Valedictory Oration: "The Future of Power."
WILLIAM LANE DEBAUFRE.

Alumni Address to the Graduating Class:
CHARLES L. TAYLOR, E.M.,
Class of 1876.

Award of the Wilbur Scholarship of $200 to
ROGER PAUL HELLER, of Bethlehem.
First in rank in the Sophomore Class.

The Williams Gold Medal to
RAYMOND WADSWORTH WALTERS, of Bethlehem.

The Williams Senior Premium to
TRUMAN GROSS SCHNABEL, of Bethlehem.

The Williams Graduate Prize of $125, open to members of the classes of 1905, 1906, and 1907, was awarded to
ROY BECK WOODRING, of Allentown.

The Alumni Prizes of $25 each, for first honor men in the Junior Class in various departments, were awarded to

WAYNE HUNTER GEIGER, of Brumfieldville, in the Electrical Engineering Department, and

JOHN HENRY CLEWELL, JR., of Winston-Salem, N. C., in the departments of Chemistry and Chemical Engineering.

The Price Prize of $25 for English Composition, open to members of the Freshman Class, was awarded to

EARLE COVINGTON SMITH, of Philadelphia.

The Williams Prizes of $10 and $5 for Excellence in English Composition, open to members of the Sophomore Class, were awarded to

GEORGE HENRY GANUNG, of New Haven, Conn.

SIDNEY LAWRENCE HECHINGER, of Washington, D. C.

LLOYD MCENTIRE, of Frenchtown, N. J.

WILBURT ROBERT WALTERS, of Bethlehem.

RAYMOND CLIFFORD CLIVER, of Williamstown, N. J.

HENRY NATHANIEL KEIFE, of Westfield, Mass.

SAMUEL RAYMOND SCHEALER, of Reading.

RAYMOND BRUNO SERFASS, of South Bethlehem.

The Wilbur Prizes of $10 for excellence in the studies of the Sophomore year were awarded as follows:

In Mathematics, to

JOHN LANE DYNAN, of Bethlehem.

In English, to

GEORGE HENRY GANUNG, of New Haven, Conn.

In Physics, to

WILLIAM HINKLE ELLIS, of Phoenixville.

The Wilbur Prizes of $15 and $10, for excellence in the studies of the Freshman year, were awarded as follows:

In Mathematics, to

ROBERT PATTISON MORE, of Bethlehem, and
JOSEPH HENRY BAUGHMAN, of Bethlehem.

In German, to

ROY VARNER EDER, of Nanticoke.

In French, to

GEOFFREY ARTHUR CAFFALL, of Brooklyn, N. Y.

In English, to

JAMES OWEN KNAUSS, of Coopersburg.

HONOR LIST, 1907.

SENIOR HONORS.

Classical Course.

First: Joseph Benson Reynolds, of New Castle.

Second: Roy Beck Woodring, of Allentown.

Latin-Scientific Course:

First: Ralph Wilhelm Kinsey, of Reading.

Civil Engineering Course.

First: Robert MacMinn, of Williamsport.

Second: Henry Joseph Groeninger, of Baltimore, Md.

Mechanical Engineering Course.

First: Walter Jacob Ammer, of Baltimore, Md.

Second: Philip Rainey Roper, of Petersburg, Va.

Mining Engineering Course.

First: Ledlie Dominick Moore, of Chatham, N. J.

Second: Ralph S. Archibald, of Washington, D. C.

Electrical Engineering Course.

First: William Lane DeBaufre, of Baltimore, Md.

Second: William Walton Crawford, of Bloomfield, Neb.

JUNIOR HONORS.

Classical Course.

First: Edwin Eustace Reinke, of Kingston, Jamaica.

Second: Theodore Franklin Kotz, of Nazareth.

Civil Engineering Course.

First: Roy Perry Miles, of Chicopee Falls, Mass.

Mechanical Engineering Course.

First: Edwin Haldeman Finnie, of South Bethlehem.

Second: Francis Theodore Nagel, of Baltimore, Md.

Mining Engineering Course.

First: Harvey Bassler, of Myerstown.

Second: Cajetan Morsack, of Roanoke, Va.

Electrical Engineering Course.

First: Wayne Hunter Geiger, of Brumfieldville.

Second: Carl Ambrose Baer, of Reading.

Chemistry and Chemical Engineering Courses.

First: John Henry Clewell, jr., of Winston-Salem, N. C.

SOPHOMORE HONORS.

In Mathematics.

First: John Lane Dynan, of Bethlehem.

Second: Charles Francis Keiffe, of Westfield, Mass.

In English.
First: George Henry Ganung, of New Haven, Conn.
Second: Wilburt Robert Walters, of Bethlehem.
In Physics.
First: William Hinkle Ellis, of Phoenixville.
Second: Samuel Raymond Schealer, of Reading.

FRESHMAN HONORS.

In Mathematics.
First: Robert Pattison More, of Bethlehem.
Second: Joseph Henry Baughman, of Bethlehem.
In German.
Roy Varner Eder, of Nanticoke.
In French.
Geoffrey Arthur Caffall, of Brooklyn, N. Y.
In English.
James Owen Knauss, of Coopersburg.

Degrees in course were then conferred by the President of the University upon the candidates whose names appear in the Thesis List, as given above. The Honorary degree of Master of Science was conferred on Lewis Buckley Stillwell, of New York, N. Y.

THE WILBUR SCHOLARSHIP.

This scholarship was founded in 1872 by E. P. Wilbur, Esq., of South Bethlehem, and is the sum of $200 awarded annually to the student in the Sophomore Class having the best record.

THE HARRY S. HAINES MEMORIAL SCHOLARSHIP.

Mrs. Henry S. Haines, of Savannah, Ga., established in 1889 a scholarship of the annual value of $200, which is devoted to the support at Lehigh University, throughout his scholastic career, of one student in the School of Mechanical Engineering.

THE FRED. MERCUR MEMORIAL FUND SCHOLARSHIPS.

Friends of the late Frederick Mercur, desiring to establish a memorial of their friendship and esteem, and to perpetuate his memory, have contributed and placed in the hands of the Trustees a fund, called "The Fred. Mercur Memorial Fund," sufficient in amount to insure the award of four scholarships for free tuition in the University.

THE ECKLEY B. COXE MEMORIAL FUND.

In memory of the late Eckley B. Coxe, Trustee of the University, Mrs. Coxe has established a fund, amounting to $28,000, the interest of which is used, under the direction of the Trustees of the University, and subject to such regulations as they may adopt, for the assistance of students who without such aid would not be able to meet the cost of living as students of the University.

THE FRANK WILLIAMS FUND.

Mr. Frank Williams, E.M., of Johnstown, Pa., a graduate of the course in Mining and Metallurgy of the Class of '87, who died October, 1900, bequeathed to the University the greater part of his estate, now amounting to over $120,000, to found a Fund, the income of which, when available, will be lent to deserving students.

THE BURR MEMORIAL FUND.

In the fall of 1905 the management of THE BURR, a college paper published monthly by the students, decided to appropriate from the surplus income of the paper a fund for the assistance of indigent students, such fund to be called "The Burr Fund."

WILBUR PRIZES.

A fund has been established, yielding an annual income of $100, by E. P. Wilbur, Esq., for distribution in prizes as the Faculty shall determine.

THE PRICE PRIZE FOR ENGLISH COMPOSITION.

Dr. Henry R. Price, an Alumnus and Trustee of the University, established in 1898 an annual prize of the value of $25, to be awarded in June to that member of the Freshman Class who shall write the best essay on a topic in English Literature assigned by the head of the department of English not later than the beginning of the Second Term in each year.

In estimating the value of all such essays the greatest stress will be laid upon clearness of thought and idiomatic force of expression; and, in the judgment of the examiner, while looking for correctness of thought in clear and forcible English, expression will take precedence of ideas. For this specific end, weight will be given to the form rather than to the matter presented.

Competitors must signify their intention not later than the first of April.

The subject for the prize essay in June, 1908, will be: "Literature in Pennsylvania."

ALUMNI PRIZES.

By a resolution of the Alumni Association of September 21, 1900, the Alumni Scholarship Fund, which was originally designed to help poor students, has with the consent of the contributors been diverted from this purpose and the income will in the future be used for prizes to members of the Junior Class. In June, 1908, two prizes of $25 each will be awarded to the first honor men of the courses in Civil Engineering and Mechanical Engineering. In subsequent years the prizes will be awarded to the first honor men of the other technical courses in turn.

ALUMNI PRIZES FOR ORATORY.

The "Alumni Association of Lehigh University" established in 1882 an annual sum of $50, to be distributed in prizes for excellence in Oratory, subject to the following

REGULATIONS.

1. The contest shall be held on the 22d day of February, or on the day designated by the University to commemorate the birthday of Washington.

2. There shall be a first prize of $25, a second of $15, and a third of $10.

3. To entitle one to be a competitor he must be a member of the Junior Class, taking a regular course.

4. Subjects for the orations shall be announced at the beginning of the first term of every year, and upon one of these each competitor shall write an oration not to exceed 1200 words, taking about eight minutes in delivery.

5. Each oration shall bear upon its first page a fictitious name or motto, and shall be accompanied by a sealed envelope, which shall be superscribed with the same name or motto, and an address by which it may be reclaimed. The envelope shall contain the real name and address of the writer, with the declaration that the oration is his own original work. The examiner, having adopted a standard of excellence, may reject any or all of the orations presented which do not attain to this standard; of such as do—should they be sufficient in number—the best six shall be chosen, and their envelopes opened. The others shall

be returned to the addresses given with their envelopes unopened.

6. The Executive Committee of the Alumni Association, or a committee of not fewer than three to be appointed by them, shall hear the competitors whose orations shall have been approved, and the awards shall be made by a majority of these judges.

7. In awarding the prizes the judges shall consider both the literary merits and the delivery of each oration.

8. These rules are subject to amendment by the Faculty.

THE CELEBRATION OF WASHINGTON'S BIRTHDAY.

The annual contest in Oratory for the Alumni Prizes was held on February 22, 1907, with the following competitors:

Harvey Bassler, of Myerstown.

Noel Guilbert Cunningham, of Watertown, Conn.

William Macfarland Donaldson, of Baltimore, Md.

Warren Edward McCann, of Philadelphia.

Thomas King, of Annapolis, Md.

Wilson Dibblee Sanderson, of Bethlehem.

The First Prize was awarded to W. E. McCann, the Second to W. M. Donaldson, and the Third to T. King.

The Judges were A. C. Rothermel, A.M., Ph.D., of Kutztown; H. S. Miner, A.C., '88, of Gloucester City, N. J.; and R. S. Siegel, B.A., '95, of Bethlehem.

In connection with this celebration an address on "Wealth and Worth" was delivered by the Hon. W. U. Hensel, of Lancaster, Ex-Attorney General of Pennsylvania. The Honorary degree of Doctor of Science was conferred on Arthur Arton Hamerschlag, of Pittsburg, Director of the Carnegie Technical Schools.

WILLIAMS PRIZES IN ENGLISH.

Prof. Edward H. Williams, jr., established in February, 1900, prizes amounting annually to three hundred and thirty-five dollars for excellence in English Composition and Oratory. The conditions of the endowment are as follows:

Sophomore Composition Prizes.

1. At the beginning of each term the Sophomore Class shall be divided into two sections alphabetically and to that student in each section who, at the end of a term, and of each term, shall receive the highest rank in English Composition during that term shall be awarded the "First Sophomore Composition Prize" of ten dollars, and to that student in each section as aforesaid

who shall receive the next highest rank in the same subject shall be awarded the "Second Sophomore Composition Prize" of five dollars. In each year there will be offered four first and four second prizes—a total of sixty dollars.

If more than one student shall receive the highest rank in any section, the amounts of the two prizes shall be added together and the sum—fifteen dollars—shall be equally divided between them, and no second prize shall be offered to that section. If more than one student shall receive the next highest rank in any section where there is but one contestant for the first prize, the second prize shall be equally divided between the two having the second rank.

Senior Premiums.

2. The Faculty shall publish within one month of the end of the University year a list of subjects for dissertations, selected from English Literature and Economics, entitled Subjects for Senior Premiums. To this list shall be appended a date near the first of January following—to be determined upon by the Faculty—when the contest shall be declared closed and the dissertations shall become due.

From the above list any member of the Senior Class may select a subject and write thereon a dissertation, whose length shall be prescribed by the Faculty, and shall send the same anonymously, but marked for identification, as the Faculty may direct, to the Secretary of the Faculty before the date aforesaid.

The Faculty, or its committee, shall meet on the above date and at subsequent adjourned meetings and, first, having determined upon a standard of excellence which each and all dissertations must reach in order to be admitted to the following competition, shall examine the dissertations submitted to them and admit those which reach the above standard. In case none are up to the standard, and are admitted, they shall declare the contest closed for that year, and no prizes shall be awarded.

If one or more dissertations are admitted as aforesaid, the Faculty, or its committee, shall arrange them in the order of their literary merit and soundness of their reasoning, and the six highest in this arrangement shall be retained and all others returned as directed by the writers, who shall remain unknown. The names of the successful writers shall be ascertained and they shall be required to recast their dissertations in the form of an oration, and to speak the same in public at such time during the Commencement Week as the Faculty shall determine.

The Faculty, or its committee, shall be the judges of excellence in the speaking, and shall award to that Senior student who shall speak his oration in the best manner, the Senior Gold Medal, of the value of one hundred dollars, or, at his option, one hundred dollars in gold. They shall award to the other five speakers the five Senior Premiums of ten dollars each.

Graduate Prize.

3. At the end of the University year, during Commencement Week, the Faculty shall publish a second list of subjects for theses selected from English Literature, Economics, Mental and Moral Science, and similar subjects which require thought and application, and which must be of such a character that their mastery shall be accomplished only through considerable research and study.

From this list any member of the class just graduating; the Senior Class of the coming University year; a graduate of one year's standing whether in or out of residence, and a graduate of any class who may be, during the coming year, in actual residence and taking post-graduate work in the University, may select a subject and write thereon a thesis of not less than five thousand words and send the same to the Secretary of the Faculty, anonymously, but marked for identification as the Faculty may designate, before the date, which the Faculty shall select within one month before the next Commencement, and which date must appear on the above list.

The Faculty, or its committee, shall meet on this date, and at adjourned meetings thereafter, and, having first established a standard of excellence, which must, first, be a high one, and second, shall require on the part of the competitor ability in the plan, development, argument, and conclusion of the work, as well as literary merit in its composition and presentation, shall admit to the following competition only those which fully attain to the above required standard.

If none of the theses submitted shall have attained to the standard aforesaid, the competition shall be declared closed and the prize shall not be awarded.

To the author of that thesis which shall have been admitted to the competition, and which shall have been declared of the highest excellence, the Graduate Prize of one hundred and twenty-five dollars shall be awarded and presented on Commencement Day with the other prizes and awards of that day.

The successful thesis shall be the property of the University, but the author shall be allowed to retain one copy. Publication of the thesis by the author will only be permitted by vote of the Faculty. Such publications must, however, be entitled Graduate Prize Thesis of the Lehigh University.

The winner of a prize shall not be allowed to compete again.

Prof. Williams has directed that the income derived from the endowment for the Williams Prizes shall be applied and used as follows:

1. All portions of said income remaining after the payment of all prizes awarded in any one year, shall be invested and added to the principal of said endowment.

2. If any prize shall, for any reason, be not awarded in any year, the sum thus unpaid shall be invested and added to the said principal.

3. If for any reason the amount of the income from said endowment shall fall below the total sum necessary to pay said prizes, the amounts of the individual prizes shall be proportionally reduced till their sum shall be equal to three-fourths of the said reduced income, and this three-fourths shall be used to pay them; the remaining one-fourth is to be invested and added to the said principal.

4. This investment of residues, as above said, shall continue till the principal of said endowment shall be sufficiently large to furnish an income at two per cent. interest, which will be sufficient to pay all said prizes now established.

5. When said principal shall be large enough to furnish the necessary sum to defray the said prizes, as stated in No. 4, the surplus income remaining after paying all the prizes awarded during the year shall be used by the President of the University to encourage oratory, debate, or any other object decided upon by the Faculty.

THE FRAZIER AND RINGER MEMORIAL FUND.

This is a fund for the medical and surgical care of students, established in memory of Benjamin West Frazier and Severin Ringer, each of whom faithfully served Lehigh University for one-third of a century. It is expected in time to amount to a sum sufficient to insure free medical and surgical attendance to all students of the University requiring such aid. The fund was started February 12, 1906, by the donation by Robert H. Sayre, Esq., of thirteen thousand dollars, the income of which is now available for the above purposes.

STUDENTS.

C.E.—Civil Engineering.
Chem.—Chemistry.
Ch.E.—Chemical Engineering.
Clas.—Classical.
E.E.—Electrical Engineering.
El Met.—Electrometallurgy.
E.M.—Mining Engineering.
L.S.—Latin-Scientific.
M.E.—Mechanical Engineering.
Met.—Metallurgical Engineering.

The names in the following lists include all the students who have registered and attended recitations at the University for the current year.

GRADUATE STUDENTS.

	For Degree.	Residence.
Sylvanus A. Becker, C.E.,	M.S.,	Bethlehem.
Rollin Landis Charles, B.A.,	M.A.,	Allentown.
Clarence Edward Clewell, E.E.,	M.S.,	Bethlehem.
Leon D. Conkling, C.E., (*Cornell University.*)	M.S.,	South Bethlehem.
Lowell E. Conrad, C.E., (*Cornell College.*)	M.S.,	South Bethlehem.
Joseph Daniels, S. B., (*Mass. Inst. of Tech.*)	M.S.,	South Bethlehem.
Alpha Albert Diefenderfer, A.C.,	M.S.,	Bethlehem.
Arthur Edgar, A.C.,	M.S.,	South Bethlehem.
Edward Staniford Foster, E.E.,	M.S.,	South Bethlehem.
Arthur Simon Gilmore, B.A.,	M.A.,	Williamsport.
Ralph John Gilmore, B.A.,	M.A.,	South Bethlehem.
Rexford Archibald Harrower, C.E.,	M.S.,	Swarthmore.
William Allen Lambert, B.A.,	M.A.,	Allentown.
Thomas Andrew Hammersley Mawhinney, B.A.,	M.A.,	South Bethlehem.
Louis Atwell Olney, A.C.,	M.S.,	Lowell, Mass.
Joseph Benson Reynolds, B.A.,	M.A.,	South Bethlehem.
Stanley Sylvester Seyfert, E.E.,	M.S.,	South Bethlehem.
John Eugene Stocker, B.S.,	M.S.,	Bethlehem.
Albert Jones Willis, C.E.,	M.S.,	South Bethlehem.

	For Degree.	Residence.
John Anderson, B.S., (*Guilford College.*)	E.E.,	Charlotte, N.C.
George Elmer Betts, A.M., (*Franklin College.*)	M.E.,	Ocean View, Del.
Ivan Robert Coffin, B.S., (*Adelphi College.*)	E.E.,	Asbury Park, N.J.
Samuel Wilson Fleming, jr., A.B., (*Princeton University.*)	M.E.,	Harrisburg.
Linn Frederick Galbraith, M.S., (*Grove City College.*)	E.E.,	Natrona.
Alfred Selman Garrison, B.A., (*Washington College.*)	E.E.,	Monkton, Md.
Chester Garfield Gilbert, Ph.B., (*University of Rochester.*)	E.M.,	New York, N.Y.
William Heyward Grimball, M.E., (*Lehigh University.*)	Met.,	Charleston, S.C.
Kent Williams Hood, B.S., (*Richmond College.*)	E.E.,	Richmond, Va.
Charles Howard Jennings, U.S.A., (*U. S. Military Academy.*)	M.E.,	Poughkeepsie, N.Y.
Frederick Tyler Lawton, Ph.B., (*Adelbert College.*)	C.E.,	Toledo, O.
Aloysius Ambrose Parker, B.A., (*Rock Hill College.*)	E.E.,	Portsmouth, Va.
David Milton Petty, B.S., (*Guilford College.*)	E.E.,	Greensboro, N.C.
George Richard Roberts, M.A., LL.B., (*St. John's Col., Univ. of Md.*)	C.E.,	Baltimore, Md.
Frederick Morris Sayre, B.S., B.A., (*Richmond College.*)	M.E.,	Hampton, Va.
Wilbur Vernon Shannon, A.B., (*Bethany College.*)	E.M.,	Charleroi.
Charles Cushman Shorkley, B.S., (*Bucknell University.*)	E.M.,	Lewisburg.
Alfred John Standing, Ph.B., (*Dickinson College.*)	E.E.,	Carlisle.
Howard Orr Stephens, A.B., (*Washington College.*)	E.E.,	Town Point, Md.

SENIOR CLASS.

CLASS OF 1908.

	Course.	Residence.
Howard Fink Bachman,	C.E.,	South Bethehem.
Carl Ambrose Baer,	E.E.,	Front Royal, Va.
Harvey Bassler,	E.M.,	Myerstown.
Eduardo Beato,	C.E.,	Havana, Cuba.
Charles Clyde Behney,	M.E.,	Carlisle.
Russell Davenport Bell,	L.S.,	New Brighton, N. Y.
James Joseph Boyle,	Ch.E.,	Freeland.
Charles Herbst Brillhart,	E.E.,	Dallastown.
George Raleigh Brothers,	L.S.,	Richmond, Va.
Algernon Raymond Burchsted,	M.E.,	South Bethlehem.
Robert Anson Burlingame,	M.E.,	Exeter, N. H.
Halsted Woodrow Caldwell,	E.M.,	Oxford, N.C.
Frank Cannon,	C.E.,	Allentown.
William Franklin Carson,	C.E.,	Philadelphia.
John Henry Clewell, jr.,	Ch.E.,	Winston-Salem, N.C.
Francis Alton Collins, jr.,	M.E.,	Flushing, N.Y.
Noel Guilbert Cunningham,	E.M.,	Watertown, Conn.
Charles Stephen Dandois,	C.E.,	Salladasburg.
John Edgar Daubenspeck,	C.E.,	Allentown.
Francis Joseph Deemer, jr.,	E.M.,	Wilkes-Barre.
Francis Johnstone Dent,	E.M.,	South Bethlehem.
William Macfarland Donaldson,	M.E.,	Baltimore, Md.
John Joseph Donegan,	M.E.,	South Bethlehem.
Charles Harrison Dorsey,	C.E.,	Baltimore, Md.
John Worthington Dorsey, jr.,	E.E.,	Baltimore, Md.
James Means Fair,	C.E.,	Saltsburg.
Edmond Crawford Fetter,	M.E.,	Reading.
Edwin Haldeman Finnie,	M.E.,	South Bethlehem.
Walter Edmund Frankenfield,	M.E.,	Butztown.
Paris Nissley Fridy,	C.E.,	Rheems.
Arthur Oram Fulton,	M.E.,	New Castle.
Wayne Hunter Geiger,	E.E.,	Douglassville.
Isaac Overholzer Gibble,	C.E.,	Lancaster.
Agustin Alejo Goytisolo,	E.E.,	Cienfuegos, Cuba.
John Lyell Gressitt,	C.E.,	Baltimore, Md.
Arnold Jay Guerber,	Chem.,	Allentown.
Arthur Henry Hafner,	M.E.,	Bethlehem.
Lewis Heck,	L.S.,	Heckton Mills.
Stanley Walter Hill,	C.E.,	Bethlehem.

John Henry Hills,	M.E.,	Baltimore, Md.
Gilbert Hand Hoppin,	E.E.,	New Brighton, N.Y.
Howard James Jackson,	C.E.,	Yonkers, N.Y.
Lawrence Wetherill Janeway,	E.M.,	Greensburg.
Paul Daniel Kauffman,	C.E.,	Reading.
Edward Norris Kimball,	E.M.,	Baltimore, Md.
Thomson King,	E.E.,	Annapolis, Md.
Stanley Bancroft Koch,	El.Met.,	South Bethlehem.
Theodore Franklin Kotz,	Clas.,	Nazareth.
Frank Joseph Kraemer,	E.E.,	Frackville.
Albert Edward Krause,	M.E.,	Bethlehem.
Arthur Benjamin Lakey,	M.E.,	Philadelphia.
Kenneth Landis,	E.E.,	Carlisle.
Clifford Barnes Langstroth,	M.E.,	Rahway, N.J.
Frank Thurman Leilich,	E.E.,	Baltimore, Md.
Ralph Edwards Loper,	E.E.,	Port Jefferson, N.Y.
Alfred Jacob Lowengrund,	E.E.,	Philadelphia.
John Philip Lynch,	Ch.E.,	Newton, N.J.
William Thomas Lytle,	E.M.,	Pleasantville.
Warren Edward McCann,	M.E.,	Philadelphia.
Ralph Finley McElfresh,	C.E.,	Washington, D.C.
Edward Macfarlane,	E.M.,	Towanda.
William Franklin Mackie,	C.E.,	Philadelphia.
John Grant Mathers,	C.E.,	Washington, D.C.
Roy Perry Miles,	C.E.,	Chicopee Falls, Mass.
John Galt Miller,	M.E.,	Louisville, Ky.
Robert Nicholas Miller,	L.S.,	Dunmore.
Walter Paul Morrison,	C.E.,	Butler.
Cajetan Morsack,	E.M.,	Roanoke, Va.
Leoncio Mosquera, jr.,	C.E.,	Mayaguez, Porto Rico.
Francis Theodore Nagel,	M.E.,	Baltimore, Md.
Michael William Nolan,	M.E.,	Carbondale.
Frank Glen Perley,	E.M.,	New York, N.Y.
Edmund Frederick Petersen,	C.E.,	Washington, D.C.
William John Priestley,	M.E.,	Chicopee, Mass.
John Raymond Prizer,	C.E.,	Pottstown.
James Montgomery Raine,	E.M.,	Evenwood, W.Va.
Edwin Eustace Reinke,	Clas.,	Kingston, Jamaica.
Lloyd Elwood Ritter,	E.E.,	Allentown.
Edward Earl Ross,	E.E.,	Philadelphia.
Wilson Dibblee Sanderson,	Clas.,	Bethlehem.
Ned Hensel Sayford,	C.E.,	Camden, N.J.

Norman Willoughby Henry Schafer, jr.,	C.E.,	Shamokin.
Robert Hoffman Shimer,	M.E.,	Bethlehem.
Humphrey Dillon Smith,	C.E.,	Philadelphia.
Thomas Albright Snyder,	M.E.,	South Bethlehem.
Albert John Spaeth,	C.E.,	Philadelphia.
Louis Myer Stamilman,	C.E.,	Scranton.
Samuel George Stem,	Clas.,	Bethlehem.
Percy Barclay Storey,	C.E.,	Johnstown.
Carroll Carter Thomas,	C.E.,	Canterbury, Del.
Frank Edgar Troutman,	M.E.,	Butler.
Albion Noyes VanVleck,	C.E.,	Linden, Md.
Lloyd Abraham Walker,	C.E.,	Rockwood.
William Haskey Walters,	M.E.,	Richland Centre.
Rudolph Frederick Warnke,	C.E.,	Mauch Chunk.
Howard George Wascher,	E.E.,	Frackville.
John Henry Westerbeke,	E.M.,	West Sayville, N.Y.
Edwin Lawrence Willson,	E.E.,	Baltimore, Md.

JUNIOR CLASS.

CLASS OF 1909.

	COURSE.	RESIDENCE.
Frederick Raymond Adelhelm,	C.E.,	Philadelphia.
Fred Thomas Agthe,	E.M.,	Catasauqua.
Clarence Lincoln Aman,	E.M.,	Wayne.
Frank Carl Anderson,	C.E.,	Butler.
Louis Antonsanti,	M.E.,	Ponce, Porto Rico.
William Lippiatt Archer,	C.E.,	Mount Vernon, N.Y.
Charles Severn Baldwin,	M.E.,	Baltimore, Md.
Andrew Provost Balston,	E.M.,	Brooklyn, N.Y.
William Foster Banks,	C.E.,	Middletown.
John Stevenson Barker,	M.E.,	Pittsburg.
Carl George Barth, jr.,	E.M.,	Philadelphia.
George Ormandy Bason,	E.E.,	Sayville, N.Y.
James Silver Bayless,	M.E.,	Baltimore, Md.
Fred Valentine Bechtel,	E.E.,	Trenton, N.J.
Alfred Peter Skillman Bellis,	M.E.,	Trenton, N.J.
Paul Herbert Bishop,	E.M.,	Bethlehem.
Edwin Marshall Bond,	E.M.,	Baltimore, Md.
William Wallace Boyd,	M.E.,	Baltimore, Md.

Edward George Boyer,	M.E.,	Catasauqua.
Walter Charles Brennan,	C.E.,	Wilkes-Barre.
Stanley Wardwell Brown,	M.E.,	Wilkes-Barre.
Alfred Copeland Callen,	E.M.,	Pottstown.
Lester Revillo Carrier,	Ch.E.,	Elmira, N.Y.
John A. Clarke, jr.,	E.E.,	Philadelphia.
Raymond Clifford Cliver,	Ch.E.,	Williamstown, N.J.
James Ross Noel Corbin,	E.M.,	Philadelphia.
Frederick Freelinghuysen Couch,	M.E.,	Carbondale.
Clarence Simmons Cowgill,	C.E.,	Paulsboro, N.J.
Thomas Coyle, jr.,	Ch.E.,	Weatherly.
Gurney Hendrickson Dayett,	C.E.,	Wilmington, Del.
Howard Fleming Dech,	Chem.,	Bethlehem.
Robert James Desh,	M.E.,	Bethlehem.
James Joseph Devine,	L.S.,	Dunmore.
William Dey,	C.E.,	Philadelphia.
Warren Cleveland Dietrich,	C.E.,	Bernville.
William James Donkel,	M.E.,	Catasauqua.
Robert Davis Taylor Dowling,	M.E.,	Trenton, N.J.
William Coppée Duncan,	E.M.,	Ishpeming, Mich.
John Lane Dynan,	E.M.,	Bethlehem.
Charles Marsh Eckert,	El.Met.,	Springfield, Mass.
Robert Mosser Eckert,	M.E.,	Allentown.
Harry Kaler Ellis,	C.E.,	Phoenixville.
William Hinkle Ellis,	C.E.,	Phoenixville.
Silas Kendrick Eshleman,	M.E.,	Leaman Place.
Charles Peter Eyrich,	C.E.,	Reading.
Floyd Cornelius Flory,	Clas.,	Edelman.
Paul Alvin Fusselman,	M.E.,	Macungie.
Joseph Hamilton Galliher,	C.E.,	Washington, D.C.
Julius William Ganser,	Chem.,	Baltimore, Md.
George Henry Ganung,	C.E.,	New Haven, Conn.
Juan Rafael Genó,	C.E.,	Santiago, Cuba.
William Joseph Gilligan,	Ch.E.,	Holyoke, Mass.
Edward Ralston Goldsborough,	C.E.,	Frederick City, Md.
Carlos Gonzalez, jr.,	C.E.,	City of Mexico, Mexico.
Edward McConnell Goucher,	C.E.,	Toronto, O.
Louis Chas. Devine Greenough,	C.E.,	Four Paths, Jamaica.
Howard Dietrich Gruber,	E.E.,	Obold.
George William Hain,	E.M.,	Reading.
Tobias Cope Harr,	Clas.,	Perkasie.
Harold Gabriel Harvey,	E.E.,	Philadelphia.

Harry Humble Hasler,	E.M.,	Ashland.
Raymond Chester Hatter,	Chem.,	South Bethlehem.
Percy Walter Havenstein,	C.E.,	Washington, D.C.
James Leslie Hays, jr.,	E.E.,	Morrisville.
Sidney Lawrence Hechinger,	C.E.,	Washington, D.C.
Joseph Clifton Heilman,	E.M.,	Montgomery.
Roger Paul Heller,	E.E.,	Bethlehem.
Lloyd Franklin Hess,	Clas.,	Hecktown.
Clarence Augustus Hoppock,	E.E.,	Lambertville, N.J.
Robert Neilson Jaggard,	C.E.,	Williamsport.
Richard Lynex James,	M.E.,	Philadelphia.
Norman Lee Johnson,	C.E.,	Elizabeth, N. J.
Charles Francis Keife,	C.E.,	Westfield, Mass.
Henry Nathaniel Keife,	Chem.,	Westfield, Mass.
Harry Osborn Kent,	Ch.E.,	Trenton, N.J.
Henry Hendricks Ketcham,	E.E.,	Rugby, N. D.
Robert Lyle Klar,	M.E.,	Westfield, Mass.
Joseph John Komara,	E.M.,	Johnstown.
Josiah Keelor Lachman,	E.M.,	Harrisburg.
Harry C. Lawrence,	E.E.,	Danville.
Charles Henry Leaman,	M.E.,	Reading.
John Barton Luckie,	E.M.,	Chester.
Lloyd McEntire,	C.E.,	Frenchtown, N.J.
Alexander Joseph McMurtrie,	C.E.,	Ashland.
Henry Edward Maddock,	Ch.E.,	Philadelphia.
Ernest Muchmore Mervine,	M.E.,	Pen Argyl.
Edwin Daniel Mill,	M.E.,	Fleetwood.
Carl Weaver Mitman,	L.S.,	South Bethlehem.
William Gerald Moore,	C.E.,	Newport, R. I.
Walter Reed Morris,	E.M.,	Cowansville.
Burton Gilbert Morss,	C.E.,	Scranton.
Frederick R. Müller,	E.M.,	Aguascalientes, Mexico.
Erie J. Ochs,	Chem.,	Emaus.
Emmet Robinson Olcott,	C.E.,	East Orange, N.J.
Richard Barrows Osbourne,	M.E.,	Ingram.
Evelyn Willing Peters,	C.E.,	South Bethlehem.
William Harris Phillippi,	C.E.,	Reading.
Worden Pope,	E.M.,	Philadelphia.
Lewis Woolman Porter,	C.E.,	Baltimore, Md.
Harry Archibald Reichenbach,	E.M.,	Allentown.
Alvin Howard Rick,	E.E.,	West Leesport.
John Theophil Ridgely,	C.E.,	Baltimore, Md.

Camilo Saenz,	M.E.,	Bogota, Colombia.
Ernesto Sanchez,	C.E.,	Camagüey, Cuba.
Charles Benjamin Sauber,	Clas.,	Allentown.
Samuel Raymond Schealer,	E.E.,	Reading.
Robert Bicknell Schenck,	El.Met.,	Saylorsburg.
Edmund Clarence Schmertz,	M.E.,	Pittsburg.
Frank Joseph Schumann,	M.E.,	Bethlehem.
Raymond Bruno Serfass,	M.E.,	South Bethlehem.
Clyde Updegraff Shank,	C.E.,	Williamsport.
James Gee Shaw,	El.Met.,	Trenton, N.J.
Thomas Harold Sheridan,	M.E.,	Chicago, Ill.
John Jacob Shultz,	C.E.,	Washington Boro.
Allan Percy Sill,	E.E.,	Watertown, N.Y.
Alexander Grover Small,	M.E.,	Brookhaven, Miss.
Walter Jerome Sommers,	M.E.,	Petersburg, Va.
Garrett DeForrest Speirs,	C.E.,	Bethlehem.
Earl Maxwell Spry,	C.E.,	Plymouth.
Edward James Sterner,	M.E.,	South Bethlehem.
Jesse Cyrus Stoddard,	E.M.,	Garrett Park, Md.
Louis Price Struble,	C.E.,	Branchville, N.J.
Charles Garland Thornburg,	C.E.,	South Bethlehem.
John Milton Toohy,	Clas.,	Marbledale, Conn.
Francis Lester Toy,	El.Met.,	Pittsburg.
Alexander Liggat Tunstall,	M.E.,	Washington, D.C.
Christian Jacob Umble,	M.E.,	Lancaster.
Carl Henry Vogt,	C.E.,	Ambler.
Wilburt Robert Walters,	Clas.,	Bethlehem.
Edward Augustus Warner, jr.,	E.E.,	St. Michaels, Md.
John Selby Martin Wharton,	M.E.,	Stockton, Md.
Nutting Wigton,	E.M.,	Pine Grove.
Raymond Mahlon Wolfe,	C.E.,	Shoemakersville.
Samuel Rollo Young,	C.E.,	Coatesville.
Luther Cleveland Zollinger,	C.E.,	Philadelphia.
Jacob Frank Zouck,	C.E.,	Glyndon, Md.

SOPHOMORE CLASS.

CLASS OF 1910.

	Course.	Residence.
Benneville King Ahrens,	E.M.,	Reading.
Fulton Russell Aleck,	C.E.,	Camden, N.J.
Archibald Levy Altemus,	C.E.,	Philadelphia.

John Christie Archibald,	E.M.,	Washington, D.C.
Geo. Frederic Raillard Bahnson,	E.E.,	Nazareth.
George Harris Baker,	C.E.,	Springfield, Mass.
Fred Palmer Bates,	Chem.,	Williamsport.
Joseph Henry Baughman,	C.E.,	Bethlehem.
Carl Haydn Bechhoefer,	C.E.	Everett.
Tolbert Orris Beitzel,	E.E.,	Mechanicsburg.
Charles Harry Bender,	E.M.,	South Bethlehem.
Percy Cooper Berkley,	E.E.,	Norfolk, Va.
Herman Jacob Bertschy,	E.E.,	Paterson, N.J.
Clayton Elmer Bilheimer,	M.E.,	Bethlehem.
George Herbert Bingham,	Clas.,	Scranton.
Clarence Bender Bishop,	E.E.,	Harrisburg.
Floyd Wilson Bishop,	C.E.,	Binghamton, N.Y.
Horace Daniel Bleiler,	E.M.,	Frackville.
George Washington Boteler,	M.E.,	Waynesboro.
Jacob Bright,	E.E.,	Hamburg.
William Wolfe Broadbent,	E.E.,	Scranton.
Richard Edmund Brown,	E.E.,	Summit Station.
Andrew Kyle Brumbaugh,	E.E.,	Baltimore, Md.
Edison Allen Buckley,	M.E.,	Westfield, N.J.
Joseph Butler,	Ch.E.,	Palmyra, N.J.
Ralph James Butz,	C.E.,	Alburtis.
John Shingle Byerly,	E.E.,	Glen Moore.
Manuel Antonio Cadenas, jr.,	C.E.,	Camaguey, Cuba.
Geoffrey Arthur Caffall,	C.E.,	Brooklyn, N.Y.
Josiah Ben Campbell,	E.E.,	Nashville, Tenn.
George Evans Carver,	E.E.,	Charleston, W. Va.
George Conway,	E.M.,	Minersville.
George Holmes Crocker,	M.E.,	Washington, D.C.
Samuel Wilbur Croll,	M.E.,	Weatherly.
Alden Curry Cummins,	E.E.,	Pittsburg.
Edward Joseph Dailey, jr.,	E.E.,	McAdoo.
William Blaine Davies,	M.E.,	Pittsburg.
Carlos Alejandro Dávila,	C.E.,	Bogota, Colombia.
Hugh Henderson Davis, jr.,	E.E.,	Sewickley.
Cecil Brown Digby,	M.E.,	Wheeling, W.Va.
William Timothy Dobson, jr.,	C.E.,	Flushing, N. Y.
Frank Loring Dodds, jr.,	M.E.,	St. Paul, Minn.
Charles Lehman Downs,	C.E.,	Baltimore, Md.
Nelson Miller Downs,	E.M.,	Steelton.
James Bates Drake,	C.E.,	Oneida, N.Y.

Charles Raymond Dunn,	M.E.,	Weatherly.
Leighton Dunning,	E.E.,	West Chester.
Arthur Henry Durns,	E.E.,	Bethlehem.
Robert Francis Dyer,	M.E.,	Washington, D.C.
Roy Varner Eder,	C.E.,	Nanticoke.
Edward Washington Ehmann,	M.E.,	Schuylkill Haven.
Nelson James Ewing,	M.E.,	Wheeling, W.Va.
Harold Griffith Eynon,	Chem.,	Philadelphia.
Jesse Leigh Farrar,	E.E.,	Washington, D.C.
Gregorio Flores,	E.M.,	Saltillo, Mexico.
Harold Alan Floyd,	Met.,	Harrisburg.
Harry Mahlon Focht,	C.E.,	Pottstown.
Charles Allen Foust,	E.E.,	Williamsport.
Edgar Malcolm Fox,	M.E.,	Pittsburg.
Parke Benjamin Fraim,	E.M.,	Reading.
John Bernard Fretz,	E.E.,	Quakertown.
Weston George Frome,	Chem.,	Pen Argyl.
Howard Massey Fry,	E.E.,	Drifton.
Francis John Furman,	E.E.,	Ashley.
Carroll Tschudi Gardner,	Ch.E.,	Baltimore, Md.
Harry Samuel Gay,	E.M.,	Shamokin.
Homer Christian Gerwig,	M.E.,	Allegheny.
Frank Carroll Gilligan,	Chem.,	Holyoke, Mass.
Lehman Phillip Gilmore,	Clas.,	Williamsport.
Milton Goedecke,	M.E.,	Brooklyn, N.Y.
James Carvill Gorman, jr.,	E.M.,	Baltimore, Md.
Charles Aloysius Gosztonyi,	M.E.,	South Bethlehem.
John Haldeman Graybill,	E.E.,	Williamsport.
Charles Augustus Gross,	E.E.,	York.
Frank Leonard Gunzenhauser,	Chem.,	Lancaster.
Charles Coleman Hagenbuch,	C.E.,	Mahanoy City.
John Ross Hall,	C.E.,	Harrisburg.
Frederick William Haltermann,	E.E.,	Stapleton, N.Y.
Francis Martin Hartley, jr.,	M.E.,	East Orange, N.J.
Carl Griffith Harwig,	E.E.,	Phillipsburg, N.J.
Charles George Heilman,	Ch.E.,	Catasauqua.
Wilbur Edwin Henry,	E.M.,	Philadelphia.
Samuel Peter Hess,	M.E.,	Bethlehem.
Horace Farington Hiney,	M.E.,	Steelton.
James Francis Hollister,	E.E.,	Locust Gap.
George Richey Horner,	M.E.,	Allegheny.
John Earl Houck,	E.E.,	LaAnna.

Henry Robert Jacob,	El.Met.,	Wilkes-Barre.
Forrest Willard Jacoby,	E.M.,	South Bethlehem.
John Frederick Jahne,	C.E.,	Eckley.
John Lester Jewell,	C.E.,	Buffalo, N.Y.
Paul Kimball Johnson,	E.E.,	Oxford, N.Y.
Harry John Kaufmann,	L.S.,	Reading.
Frank Raymond Kemmer,	El.Met.,	Danville.
Caleb Samuel Kenney,	C.E.,	Dover, Del.
Edward Mathias Killough,	C.E.,	Bethlehem.
James Owen Knauss,	Clas.,	Coopersburg.
Herbert Railey Kynor,	E.M.,	Pottsville.
Sterling Sidney Lanier, jr.,	E.M.,	Birmingham, Ala.
William Fritsche Lantz,	Chem.,	Bethlehem.
Frank Pell Lawrence,	C.E.,	Newark, N.J.
Chester Bernard Lawson,	E.E.,	Pottsville.
Ilun Lyman Lay,	E.E.,	Wuchang, China.
Lloyd Adderson LeVan,	C.E.,	Siegfried.
William Lewis,	E.E.,	Washington, D.C.
José Lores,	E.E.,	Cienfuegos, Cuba.
John Frederick McClain,	Ch.E.,	Williamsport.
William Johnston McCormick,	E.E.,	Brownsville.
Francis Regis McDonnell,	C.E.,	Baltimore, Md.
Harry Colin Macdonald,	Ch.E.,	Williamsport.
William Adolph Maeder,	Met.,	Pittsburg.
Arthur Mandell, jr.,	M.E.,	Titusville.
Clarence Mather,	C.E.,	Trenton, N.J.
Rufus Bloys Mathews,	C.E.,	Rosemont, N.J.
Samuel May,	C.E.,	Baltimore, Md.
Ernest Arbuckle Merriman,	C.E.,	Welland, Ontario.
J. Homer Meseroll,	E.E.,	Lakewood, N.J.
Harry Lerch Miller,	M.E.,	Bath.
Veon Irwin Moncrieff,	M.E.,	Kutztown.
Robert Pattison More,	Clas.,	Bethlehem.
George Francis Murnane,	C.E.,	Brooklyn, N.Y.
Albert Durant Neal,	E.E.,	Pittsburg.
Otto Bernard Niesen,	M.E.,	Carbondale.
Eduard Augusto Nuñez,	C.E.,	Cienfuegos, Cuba.
José Oliveras,	M.E.,	Huamantla, Mexico.
Alfred Stack Osbourne,	M.E.,	Ingram.
Allen Maxwell Padgett,	C.E.,	Bethlehem.
Stephen Eugene Page,	C.E.,	Newark, N.J.
Chester Burdick Pearsall,	M.E.,	Westfield, N.J.

Clarence Francis Peter,	M.E.,	South Bethlehem.
James Harvey Pierce,	E.M.,	Frackville.
John Raymond Pillow,	M.E.,	Butler.
Charles Heyl Poole,	C.E.,	Camden, N.J.
William Ziegler Price,	E.M.,	Lykens.
John Thomas Rees,	E.M.,	Bethlehem.
Raymond Henry Richards,	C.E.,	Dover, N.J.
Robert Enterline Rickert,	C.E.,	Harrisburg.
Henry Meyer Riley,	El.Met.,	Baltimore, Md.
William Jacob Robbins,	Clas.,	Bethlehem.
Roswell Morton Roper,	C.E.,	East Orange, N.J.
John Sisselberger Rowan,	E.E.,	Baltimore, Md.
John McEntee Sanderson,	Ch.E.,	Bethlehem.
Frederick Harold Sasscer,	C.E.,	Upper Marlboro, Md.
Frank Maxwell Sayford,	C.E.,	Camden, N.J.
Walter John Schiverea,	C.E.,	Ozone Park, N.Y.
Ira David Schneller,	Ch.E.,	Bethlehem.
Christian Allen Schwarzwaelder,	M.E.,	Brooklyn, N.Y.
William Hillegass Schwenk,	M.E.,	Pottstown.
Spencer Shaffer,	M.E.,	Harrisburg.
Charles Norman Shaffner,	C.E.,	Pine Grove.
Edward Bernard Shimer,	Ch.E.,	Easton.
Charles Shoemaker,	E.M.,	Philadelphia.
Bruce Gillespie Shotton,	M.E.,	Scranton.
Henry Charles Simmins,	C.E.,	Philadelphia.
Floyd Morgan Skidgell,	Chem.,	Meriden, Conn.
Earle Covington Smith,	E.M.,	Philadelphia.
Herman Percy Smith,	E.M.,	Lockport, N.Y.
Walter Edward Smith,	E.M.,	Pittsburg.
Stanley Osborn Solt,	M.E.,	Bethlehem.
William Anderson Staab,	E.M.,	Northampton, Mass.
John Baptist Stobaeus, jr.,	Ch.E.,	Newark, N.J.
William Carl Stobaeus,	Ch.E.,	Newark, N.J.
Richard Stockton,	M.E.,	Buffalo, N.Y.
Raymond Kneas Stritzinger,	C.E.,	Norristown.
Horace Reisler Stubbs,	C.E.,	Oxford.
William Earle Sturges, jr.,	C.E.,	Phoenixville.
James Joseph Sullivan,	E.E.,	Harrison, N.J.
Robert Bricker Swope,	E.E.,	Harrisburg.
Philip Hiram Thayer,	Ch.E.,	Holyoke, Mass.
Richard Hamilton Torrey,	E.M.,	Brooklyn, N.Y.
Lloyd Burton Treat,	E.M.,	Glastonbury, Conn.

Arthur William Trembley,	E.E.,	Saranac Lake, N.Y.
Holden Ira Tripp,	C.E.,	Scranton.
Greyson Prevost Troutman,	E.M.,	Centralia.
Ray Frank Turner,	E.E.,	Kane.
Thomas Marshall Uptegraff,	E.M.,	Pittsburg.
Warren Corbin VanBlarcom,	C.E.,	Scranton.
Richard August Wahl,	C.E.,	Bethlehem.
Bradley Henry Waltz,	C.E.,	Baltimore, Md.
George Randall Waltz,	C.E.,	Williamsport.
Harold Lee Watson,	E.M.,	Newtown.
Sayre Welles,	E.M.,	Wyalusing.
David Gordian Williams,	M.E.,	Slatington.
Roy Neath Williams,	C.E.,	Scranton.
Harry Aber Wintermute,	E.E.,	Augusta, N.J.
Carl August Woerwag,	M.E.,	Philadelphia.
Clifford Candy Young,	Chem.,	Kansas City, Mo.
John Hess Young, jr.,	M.E.,	Williamsport.
Allen Herbert Zane,	Chem.,	Mauch Chunk.

FRESHMAN CLASS.

CLASS OF 1911.

	Course.	Residence.
Charles Daniel Addams,	C.E.,	Reading.
Carl Samuel Albright,	E.E.,	Middletown.
Henry John Althenn,	Ch.E.,	South Bethlehem.
Joseph Glenn Anderson,	M.E.,	New Castle.
Gifford Childs Bakewell,	E.M.,	Pittsburg.
Earle Aaron Ball,	E.E.,	Quakertown.
George Andrew Barker,	E.E.,	Pittsburg.
Edgar Foster Baumgartner,	M.E.,	Asbury Park, N.J.
James Holmes Bay,	E.M.,	Baltimore, Md.
John Louis Becker,	C.E.,	Newark, N.J.
Sylvan Birnbaum,	E.E.,	Baltimore, Md.
Alexander Gordon Black,	E.M.,	Fort McKavett, Texas.
Harold Franklin Blanchard,	E.E.,	South Orange, N.J.
John Musgrave Bley,	C.E.,	Narberth.
Roque Jacinto Bolla,	E.M.,	Corrientes, Arg. Rep.
Frank Spaulding Borden,	C.E.,	Tunkhannock.
Sherman Blaine Bowen,	E.M.,	Savanna, Ill.

Robert Earle Bratten,	C.E.,	Harrisburg.
Albert Daly Bryant,	E.M.,	Washington, D.C.
Charles Reginald Bulley,	El.Met.,	Syracuse, N.Y.
Maynard Crane Burrell,	E.M.,	Washington, D.C.
Grover Butz,	M.E.,	Schuylkill Haven.
John Joseph Cannon,	C.E.,	Allentown.
John Dent Carey,	C.E.,	Rochester, N.Y.
John Marshall Carroll,	C.E.,	Baltimore, Md.
Walter Cornelius Carson,	C.E.,	Philadelphia.
Frank Clyde Carver,	E.M.,	Wabasha, Minn.
Charles Lopez Cespedes,	C.E.,	Havana, Cuba.
Carlton Hart Chapin,	C.E.,	Brooklyn, N.Y.
Michael Angelo Chiriboga,	E.M.,	Ambato, Ecuador.
William R. Churchill,	M.E.,	Sanitaria Springs, N.Y.
Russell Samuel Collins,	M.E.,	South Bethlehem.
Elmer McDowell Conover,	M.E.,	Lambertville, N.J.
George Corbett Craver,	M.E.,	Binghamton, N.Y.
Robert Fulton Crawford,	M.E.,	Steubenville, O.
Raymond Floyd Crump,	M.E.,	Pittsburg.
Thomas Russell Davies,	M.E.,	Montrose.
Joseph Ralph Dawson,	E.E.,	Washington.
Harry Stambaugh Demaree,	E.E.,	Newport.
Rondo Christery DeNyse,	C.E.,	Long Branch, N.J.
Philip Sadtler Dickey, jr.,	M.E.,	Baltimore, Md.
John H. Dillon,	C.E.,	New York, N.Y.
Harry Dunstan,	M.E.,	Carbondale.
Carl Watson Evans,	E.M.,	Great Falls, Mont.
William Ewart Fairhurst,	E.M.,	Paterson, N.J.
Willis Manning Farris, jr.,	M.E.,	Nashville, Tenn.
Raymond William Faust,	Ch.E.	Belvidere, N.J.
Fred George Ferber,	E.E.,	Scranton.
Archie Warren Fisher,	C.E.,	Macomb, Ill.
Franklin Fisher,	C.E.,	Lewiston, Me.
Jeremy Fisher,	E.E.,	Lewiston, Me.
Henry Hosford Fithian,	E.E.,	Bridgeton, N.J.
Joseph Christopher Fitzharris,	C.E.,	Gallitzin.
Daniel Merritt Flick,	Ch.E.,	Dushore.
John Philip Flippen,	M.E.,	Cartersville, Va.
Franklin Ford,	E.M.,	Baltimore, Md.
Arthur Calvin Frey,	M.E.,	Quakertown.
Fred Earley Galbraith,	E.E.,	Williamsport.
Carlos Alejandro Gallardo,	C.E.,	Guayaquil, Ecuador.

Donald Gibson,	El.Met.,	Great Falls, Mont.
William LaRoy Giles,	C.E.,	Carbondale.
Philip McLean Ginder,	Ch.E.,	Rockport.
Samuel D. Gladding,	E.E.,	Crisfield, Md.
George E. Goeppert,	E.E.,	Freeland.
Harry Webster Dieter Goldsmith,	C.E.,	East Catasauqua.
Andrés Gómez,	C.E.,	Havana, Cuba.
Maurice Good,	El.Met.,	Havre de Grace, Md.
William Remington Grady,	C.E.,	Denver, Col.
Jacob P. Griesemer,	C.E.,	Allentown.
John Griffen,	Ch.E.,	Phoenixville.
Evan Belford Guth,	E.E.,	Coplay.
Harry Alter Haas,	M.E.,	Tamauqua.
Eugene Willis Hankee,	M.E.,	Slatington.
Joseph William Harne,	E.E.,	Bethlehem.
George Fulton Hartman,	M.E.,	Latrobe.
Carl William Hasek,	Clas.,	Franklin.
Frank Chisholm Heard,	E.M.,	Brookline, Mass.
Columbus Joseph Hellen,	C.E.,	Baltimore, Md.
Charles Wilbur Hendricks,	E.E.,	Philadelphia.
Woldemar S. Herrmann,	E.E.,	Philadelphia.
Albert Augustus Hesser, jr.,	C.E.,	Schuylkill Haven.
Lloyd Hoffman,	E.M.,	Pottersville, N.J.
Philip Horn Hoffman, jr.,	C.E.,	Baltimore, Md.
Albert K. Hohl,	C.E.,	Philadelphia.
Daniel Horcasitas, jr.,	C.E.,	Chihuahua, Mexico.
Aldridge Ellis Hunt,	C.E.,	Stroudsburg.
Arthur Kellogg Hunt,	M.E.,	Asbury Park, N.J.
David Harrison Hunter,	E.E.,	Hagerstown, Md.
Myrl Lamont Jacobs,	E.M.,	Nyaunghla, Upper Burma, India.
Russell Finch Jacoby,	E.M.,	South Bethlehem.
Henry Janney,	E.E.,	Smyrna, Del.
James Miles Kalbach,	M.E.,	North Heidelberg.
Harold Kaminski,	Met.,	New York, N.Y.
Daniel Charles Keefe,	M.E.,	South Bethlehem.
Raymond O. Keiser,	M.E.,	Altoona.
Ralph Winfield Kempsmith,	M.E.,	Bethlehem.
Horace Donald Kerr,	L.S.,	Titusville.
Floyd V. Kesselman,	M.E.,	Butler.
John Sweigard Kiesel,	M.E.,	Altoona.

Stanley Kitchel,	E.M.,	Milwaukee, Wis.
Charles Koch,	M.E.,	Philadelphia.
Charles Hemmerly Kocher,	Clas.,	South Bethlehem.
Thomas Claude Kraemer,	El.Met.,	Frackville.
Robert Fritzinger Kratz,	C.E.,	Allentown.
Robert Permenio Krause,	C.E.,	Bethlehem.
Mark John Kreidler,	E.M.,	Bethlehem.
Shelby L. Kring,	M.E.,	Johnstown.
Charles George Kuhns,	Ch.E.,	Allentown.
Charles Isaac Kutz,	M.E.,	Fleetwood.
Chinchoa L. Kwong,	E.M.,	Tsinanfu, China.
Allen Victor Laub,	Clas.,	Bethlehem.
William Hill Lazarus,	C.E.,	Mt. Carmel.
Edmund Bruce Lehr,	E.M.,	Allentown.
Norton Lewis Lichtenwalner,	M.E.,	Allentown.
Clifford Franklin Lincoln,	C.E.,	Philadelphia.
Duncan MacDougald Little,	C.E.,	Brooklyn, N.Y.
Henry Gay Livesay,	C.E.	Fishersville, Va.
Pedro Nicolas Lopez,	E.M.,	New York, N.Y.
Donald Randolph Lowry,	M.E.,	Berwick.
John Gibbon McCoy,	M.E.,	South Bethlehem.
Laurence Clagette McCoy,	E.E.,	Hagerstown, Md.
William Harold McCreary,	L.S.,	Bethlehem.
Clyde Kemerer McFetridge,	E.M.,	Allentown.
Alexander McKenzie, jr.,	E.M.,	New York, N.Y.
Harold Stanley Mabee,	C.E.,	Williamsport.
Thomas Millspaugh Mackey,	E.M.,	Philadelphia.
Charles Wesley Martin,	E.M.,	Steelton.
Walter LeRoy Merkel,	M.E.,	Reading.
William Walters Merwin,	E.M.,	Pittsburg.
Elwood F. Meschter,	M.E.,	East Greenville.
Claude Calvin Messinger,	El.Met.,	Allentown.
Harry Lou Miller,	C.E.,	Utica, N.Y.
Ira Long Miller,	C.E.,	Harrisburg.
Ralph Miller,	C.E.,	Allentown.
Seymour Armstrong Miller,	El.Met.,	New York, N.Y.
William Henry Mohr,	C.E.,	Quakertown.
Earl Lamont Morgan,	M.E.,	Bethlehem.
Alan Cunningham Morris,	Ch.E.,	Pottsville.
John Linsley Mosher,	E.M.,	Baltimore, Md.
Roque G. Muñoz,	C.E.,	Tegucigalpa, Honduras.
Bernard Munter, jr.,	E.E.,	Baltimore, Md.

William J. Murdock,	M.E.,	Bethlehem.
Thomas Nicholson, 3rd,	Clas.,	Hawkins Station.
Adolfo Parra,	E.E.,	New York, N.Y.
George Elliott Patterson,	C.E.,	Key West, Fla.
Elmer Peloubet,	C.E.,	Newark, N.J.
William Clinton Peterman,	E.E.,	Royersford.
Henry Remington Phillips,	C.E.,	Chicago, Ill.
James Cameron Poffenberger,	C.E.,	Harrisburg.
Alfred Priestley,	C.E.,	Chicopee, Mass.
Lawrance Austen Pullis,	C.E.,	Bayshore, N.Y.
Herbert Thickins Quin,	M.E.,	Wilkes-Barre.
José Ramirez, jr.,	M.E.,	Aguadilla, Porto Rico.
Charles William Rauch,	E.M.,	Bethlehem.
Lewis Rhinehart Pfoutz Reese,	C.E.,	Gwynnbrook, Md.
Henry Reimers,	C.E.,	New Brighton, N. Y.
George Henry Reussner,	C.E.,	South Bethlehem.
Chester Hager Rhodes,	Clas.,	Gouldsboro.
Raymond Lee Riley,	M.E.,	Williamsport.
Gerald Staats Rinehart,	C.E.,	New York, N.Y.
Charles Leslie Rittenhouse,	C.E.,	Flemington, N.J.
Howard Christian Roeder,	C.E.,	Allentown.
Earle George Rogers,	E.M.,	Salt Lake City, Utah.
Clarence Eugene Rominger,	E.E.,	Indianapolis, Ind.
William Nyce Rorer,	E.E.,	Jenkintown.
James Arthur Rose,	E.E.,	Lancaster.
Walter Gottlieb Schall,	M.E.,	South Bethlehem.
John Scott, jr.,	E.M.,	New York, N.Y.
Archibald Robert Shaw,	C.E.,	New York, N.Y.
Howard Mabee Simpson,	C.E.,	Newton, N.J.
John Hampton Slate,	M.E.,	Williamsport.
James Humble Smith, jr.,	E.M.,	Mount Carmel.
Lewis W. Smith,	Met.,	Williamsport.
Miles Catlin Smith,	Ch.E.,	Towanda.
Oliver Hobson Smith,	M.E.,	Pottstown.
Robert Shackford Smith,	E.E.,	City of Mexico, Mexico.
Walter Allen Smith,	Chem.,	Bethlehem.
Clayton Edward Snyder,	E.E.,	Pittsburg.
Paul Robert Snyder,	Met.,	Bethlehem.
John Alexander Sosnowski,	C.E.,	Freeland.
Hugh Spilsbury,	E.M.,	New York, N.Y.
Albert Poole Spooner,	Met.,	Harrisburg.

Jacob Stair, jr.,	E.E.,	York.
Harry Roswell Stevens,	Chem.,	Scranton.
Gilbert Stockton,	E.M.,	Buffalo, N.Y.
Robert Daniel Strauch,	C.E.,	Cressona.
Richard Hamilton Street,	E.M.,	Brooklyn, N.Y.
Raymond Frederick Tarbell,	C.E.,	Chicopee Falls, Mass.
Dorsey Thompson,	M.E.,	Ellicott City, Md.
Chesley Covington Thornburg,	C.E.,	South Bethlehem.
Joseph Heinrich Throm,	C.E.,	Paterson, N. J.
Howard Grant Toone,	E.E.,	Camden, N.J.
James White Tremlett.	E.M.,	San Antonio, Texas.
Charles Curtis Tressler,	E.M.,	Mahanoy.
Felix Frank Trotter, jr.,	E.E.,	Albuquerque, N.M.
José Ignacio Vela,	M.E.,	Ambato, Ecuador.
Samuel Clare Wagner,	E.E.,	Erie.
Lester B. Walbridge,	M.E.,	Brooklyn, N.Y.
Clarence C. Walters,	Met.,	Bethlehem.
Kenneth Rogers Warner,	E.E.,	Montrose.
Ario Wear,	C.E.,	Bethlehem.
Arthur Wells,	M.E.,	Germantown.
Ralph Schaffer Wenner,	E.E.,	Allentown.
Roy Vernet Whitman,	C.E.,	Scranton.
Clifford Riddle Whyte,	E.M.,	Washington, D.C.
Arthur Linforth Willgoose,	C.E.,	Brooklyn, N.Y.
Leon Wittgenstein,	E.M.,	Louisville, Ky.
George Reid Wood,	E.M.,	Pottsville.
Robert Farmer Wood,	C.E.,	Pottsville.
Nie Quong Wu,	C.E.,	China.
Edmund Wilkins Young,	M.E.,	Astoria, N.Y.
Harrison Hurst Young,	M.E.,	Titusville.
Hysler J. Zane,	C.E.,	Sellersville.

SPECIAL STUDENTS.

	Course.	Residence.
George Blair,	E.M.,	Pittsburg.
William Ansel Ernst,	Chem.,	Bethlehem.
George Clare Matter,	C.E.,	Newark, N.J.
Samuel Strauss,	Chem.,	South Bethlehem.
Chester Holt Struble,	E.M.,	Holyoke, Mass.
Ralph Herbert Warren,	M.E.,	Bethlehem.

SUMMER SCHOOL STUDENTS.

(Attended summer school but did not enter in September.)

	Course.	Residence.
James Brayshawe Arthur,	E.E.,	Baltimore, Md.
Harold Provost Balston,	M.E.,	Brooklyn, N.Y.
Calder Blaine Bressler,	E.M.,	South Bethlehem.
Charles Wythe Cooke,	E.E.,	Front Royal, Va.
William Albert Draper,	C.E.,	Washington, D.C.
Clarence Lincoln Eastman,	E.E.,	Waterville, N.Y.
George Courtney Hall,	M.E.,	Pocomoke, Md.
Ferdinand Eugene Hayes, jr.,	C.E.,	Louisville, Ky.
William Howard Landis,	E.E.,	Perkasie.
Harold Lewis Medlar,	C.E.,	Pottsville.
John Sheridan Quinn,	Chem.,	South Bethlehem.
Andrew Carnegie Ramsay,	E.M.,	Greensburg.
Frank Frederick Robertson,	Chem.,	Fairmont, W.Va.
August H. Schaaf,	C.E.,	Baltimore, Md.
Gordon Leroy Schnerr,	M.E.,	Peckville.
Julian U. Siegel,	Chem.,	Salt Lake City, Utah.
James Arthur Solomon,	M.E.,	Bethlehem.
Edward Post Tooker,	E.M.,	Port Jefferson, N. Y.

SUMMARY OF STUDENTS BY CLASSES AND COURSES.

	Graduates.	Seniors.	Juniors.	Sophomores.	Freshmen.	Specials.	Summer School Students.	Totals.
Classical.....	5	4	6	5	5			25
Latin-Scientific	2	4	2	1	2			11
Civil Eng.....	7	32	45	50	65	1	4	204
Mechan. Eng...	4	24	32	38	47	1	4	150
Mining Eng....	4	13	22	28	39	2	3	111
Metal. Eng.....	1			2	5			8
Electromet.....		1	4	3	6			14
Electric. Eng...	12	16	14	42	34		4	122
Chemistry.....	3	1	5	9	2	2	3	25
Chem. Eng.....		3	6	11	8			28
Totals.....	38	98	136	189	213	6	18	698

SUMMARY OF STUDENTS BY STATES.

Maine	2
New Hampshire	1
Massachusetts	16
Rhode Island	1
Connecticut	5
New York	56
New Jersey	52
Pennsylvania	407
Delaware	5
Maryland	54
District of Columbia	16
Virginia	11
West Virginia	5
North Carolina	4
South Carolina	1
Florida	1
Kentucky	3
Tennessee	2
Alabama	1
Mississippi	1
Ohio	3
Indiana	1
Illinois	4
Wisconsin	1
Michigan	1
Minnesota	2
North Dakota	1
Missouri	1
Texas	2
New Mexico	1
Colorado	1
Montana	2
Utah	2
Canada	1
Mexico	6
Cuba	9
Porto Rico	3
Jamaica	2
Honduras	1
Colombia	2
Ecuador	3
Argentine Republic	1
India	1
China	3
	698

ALUMNI

OF

LEHIGH UNIVERSITY.

[An Employment Bureau for Lehigh University graduates is maintained by the Alumni Association.]

CLASS OF 1869.

*J. Haynes Hinds Corbin, A.C.

*Miles Rock, C.E.

Charles Edward Ronaldson, M.E., Mechanical Eng'r, 4017 Locust St., Philadelphia.

CLASS OF 1870.

*Lehman Preston Ashmead, A.C., M.D.

Richard Brodhead, M.E., care State Trust Co., Vicksburg, Miss.

William R. Butler, M.E., Manufacturer, Mauch Chunk, Pa.

*George A. Jenkins, A.C.

William J. Kerr, A.C., M.E.

*Harry E. Packer, A.C.

Henry R. Price, C.E., M.D., Physician, 435 Clinton Ave., Brooklyn, N.Y.

Henry B. Reed, B.A., M.D., Physician (retired), Milford, Pa.

*William Dunlop Ronaldson, B.A., M.D.

John M. Thome, C.E., Ph.D.

*Russel B. Yates, C.E.

CLASS OF 1871.

*Jacob Neff Barr, M.E.

Frank Laurent Clerc, C.E., Shirley Hotel, Denver, Col.

Henry S. Drinker, E.M., LL.D., Pres., Lehigh University, South Bethlehem, Pa.

Edward F. Fassitt, A.C., Box 137, Glenside, Pa.

William Hull MacCarthy, B.A., 283 George St., New Haven, Conn.

*Waldron Shapleigh, A.C.

*Charles G. Weaver, C.E.

* Deceased.

CLASS OF 1872.

GEORGE PIERREPONT BLAND, C.E., Pres., Keystone Structural Co., 510 Harrison Bldg., Philadelphia, Pa. Res: 3220 Woodland Ave.

*DANIEL P. BRUNER, C.E.

*HENRY ST. LEGER COPPÉE, C.E.

*F. R. CHRISTIAN DEGENHART, A.C.

HARVEY S. HOUSKEEPER, B.A., Prof. of Mathematics, Baltimore Polytechnic Inst., Baltimore, Md. Res: 2322 Guilford Ave.

*LENTZ EDMUND KLOTZ, C.E.

OSCAR MOORE LANCE, A.C., Gen. Mgr., Spring Brook Water Supply Co., Box 124, Wilkes-Barre, Pa. Res: Kingston, Pa.

RAYMUNDO FLORESTA DE MIRANDA, M.E.

JAMES S. POLHEMUS, C.E., Asst. U. S. Eng'r, U. S. Eng'r's Office, Portland, Ore.

HENRY DARCY SCUDDER, C.E., with Fidelity Trust Co., Prudential Bldg., Newark, N.J. Res: 19 Burnett St., East Orange, N.J.

CLASS OF 1873.

*WASHINGTON HOPKINS BAKER, A.C., M.D.

ROBERT B. CLAXTON, C.E., 2 Plein 1813, The Hague, Holland.

JAMES PEYTON STUART LAWRANCE, M.E., Captain, U. S. Navy, Art Club, Philadelphia, Pa.

HILDEBRANDO BARJONA DE MIRANDA, A.C., Prof. of English, Lyceo Paraence, Belém do Para, Brazil.

WALLACE MCILVAINE SCUDDER, M.E., Editor & Publisher, *Evening News*, 215 Market St., Newark, N.J. Res: 10 Washington Pl.

CLASS OF 1874.

CASPAR WISTAR HAINES, A.M. (Haverford, '72), C.E., Consulting Eng'r, Mexican Vice-Consul, 322 Arcade Bldg., Philadelphia, Pa. Res: Cheltenham, Pa.

WILLIAM DAVIS HARTSHORNE, C.E., Resident Agt., Arlington Mills, Lawrence and Methuen, Mass. Res: 40 Pleasant St., Methuen, Mass.

ALLAN A. HERR, C.E., Real Estate and Insurance Agt., 108 E. King St., Lancaster, Pa.

*THOMAS MERRITT, C.E.

*WILLIAM MARSHALL REES, C.E.

CLASS OF 1875.

*CHARLES JULIUS BECHDOLT, C.E.

ANTONIO M. CAÑADAS, A.C.

JOHN F. HALBACH, B.A., B.M.

WILLIAM ARTHUR LATHROP, C.E., Pres., Lehigh Coal & Navigation Co., Lehigh Bldg., 108 S. 4th St., Philadelphia, Pa. Res: 549 Wyoming Ave., Dorranceton, Pa.

ARTHUR E. MEAKER, C.E., Prof. of Mathematics, Lehigh University, South Bethlehem, Pa. Res: 542 North St., Bethlehem, Pa.

JOSEPH M. MORRISON, C.E., Eng'r & Supt. of Structures, Central Vermont Ry., St. Albans, Vt.

FRANCIS SEBASTIAN PECKE, C.E., Asst. Eng'r, Patchogue Div., Board of Water Supply of City of New York, Patchogue, N.Y. Res: Flushing, N.Y.

EDWARD H. WILLIAMS, JR., B.A. (Yale), A.C., E.M. ('76), F.G.S.A., Farmer, Andover, Mass.

*CARL F. ZOGBAUM, C.E.

CLASS OF 1876.

FRANK C. ANGLE, C.E., Attorney-at-Law, Danville, Pa. Res: 10 E. Market St.

*JAMES DEWITT CARSON, C.E.

*THOMAS WILLIAM FREDERICK, M.E.

WILLIAM GRIFFITH, C.E., Consulting Mining Eng'r & Geologist, Coal Exchange, Scranton, Pa. Res: 405 Susquehanna Ave., Pittston, Pa.

C. WILLIAM MACFARLANE, C.E., Ph.D. (Freiburg i.B. '93), The Newport, 16th & Spruce Sts., Philadelphia, Pa.

ROBERT W. MAHON, C.E., Ph.D. (Johns Hopkins), with New York Central & Hudson River R.R., West Albany, N.Y.

J. J. DEGAMA MALCHER, M.E.

WALTER PERCIVAL RICE, C.E., Consulting Civil Eng'r, 722 Society for Savings Bldg., Cleveland, O. Res: 124 Crawford Road.

HENRY RICHARDS, E.M., Supt., Dickinson Mine, Musconetcong Iron Works, Dover, N.J. Res: 11 McFarland St.

LOWDEN W. RICHARDS, M.E., Mgr. & Treas., Lebanon Valley Furnace Co., Lebanon, Pa. Res: Hathaway Park.

CHARLES LEWIS TAYLOR, E.M., Chairman, Carnegie Relief Fund; Pres., Carnegie Hero Fund, 325 Carnegie Bldg., Pittsburg, Pa.

CLASS OF 1877.

JOHN EAGLEY, C.E., North Springfield, Pa.

PERCIVAL D. GIESS, C.E., 297 Prospect Ave., Bethlehem, Pa.

*ANDREW M. GLASSEL, C.E.

GEORGE MAURICE HELLER, C.E., Bridge Eng'r, s.e. cor. Ridge Ave. & Righter St., Roxborough, Philadelphia, Pa.

HENRY SYLVESTER JACOBY, C.E., Prof. of Bridge Engineering, Cornell University, Ithaca, N.Y. Res: 7 Reservoir Ave.

JAMES FREEMONT MARSTELLER, C.E., Gen. Mgr., Pennsylvania, Beach Creek & Eastern Coal Co., Cresson, Pa. Res: Ebensburg, Pa.

*SEIZO MIYAHARA, C.E.

CHARLES R. RAUCH, A.C., Chief Chemist, Lehigh Portland Cement Co., Allentown, Pa. Res: Spring St., Bethlehem, Pa.

LEWIS THEODORE WOLLE, C.E., Sec. & Treas., Cambria Fuel Co., Cambria, Wyo.

CLASS OF 1878.

CHARLES BULL, M.E., with Estate of E. A. Hoffman, 258 Broadway, New York, N.Y. Res: Upper Montclair, N.J.

*JAMES E. GILBERT, C.E.

WILLIAM CONVERS HAZLETT, M.E., Architect, 1133 Broadway, New York, N.Y. Res: 174 W. 97th St.

FRANK PERLEY HOWE, B.A. (Brown, '72), E.M., Pres., Cranberry Iron & Coal Co.; Mgr., Rockhill Furnace Co.; 230 Drexel Bldg., Philadelphia, Pa. Res: 242 S. 17th St.

NATHANIEL LAFON, M.E., Mining Eng'r, Red Jacket, W.Va.

BENJAMIN B. NOSTRAND, JR., M.E., Pres. & Gen. Mgr., Peekskill Lighting & R. R. Co., Peekskill, N.Y. Res: 929 Paulding St.

MILNOR PECK PARET, C.E., Chief Eng'r, Kansas City, Mexico & Orient Ry., 705 Bryant Bldg., Kansas City, Mo. Res: 3628 Jefferson St.

HOLBROOK FITZ JOHN PORTER, M.E., Consulting Industrial Eng'r, Metropolitan Bldg., 1 Madison Ave., New York, N.Y. Res: 15 E. 10th St.

WILLIAM K. RANDOLPH, C.E.

ROBERT H. READ, B.A., Patent Attorney, General Electric Co., Schenectady, N.Y. Res: 30 University Pl.

HENRY CHURCH WILSON, C.E., Mgr., Technical Dept., Hapgoods, 305 Broadway, New York, N.Y. Res: 143 E. 27th St.

CLASS OF 1879

JAMES S. CUNNINGHAM, M.E., Southern Representative, E. J. Berwind Coal Lands. Res: 506 Grove Ave., Johnstown, Pa.

*JOSEPH HILL PADDOCK, M.E.

FITZ WILLIAM SARGENT, C.E., Chief Eng'r, American Brake Shoe & Foundry Co., Box 15, Mahwah, N.J.

RICHARD HAWLEY TUCKER, C.E., Astronomer, Acting Director, Lick Observatory, Mt. Hamilton, Cal.

CLASS OF 1880.

ABRAM BRUNER, E.M., Asst. to Chief Eng'r, Norfolk & Western Ry., Roanoke, Va.

MURRAY MORRIS DUNCAN, A.C., E.M. ('80), Agt., Cleveland-Cliffs Iron Co., Ishpeming, Mich.

THOMAS HUGHLETT HARDCASTLE, B.A., M.A. ('82), LL.B., Attorney-at-Law; Lecturer, Law School of University of Colorado, Boulder, Col.; Prof. of Law of Contracts, Law School of University of Denver; 316 Boston Bldg., Denver, Col.

JOHN TINSLEY JETER, E.M., Representing Vulcan Iron Works, Wilkes-Barre, Pa. Address: Dallas, Pa.

CHARLES FRANCIS KING, A.C., Inspector of Buildings for New York City, Borough Hall, cor. 3rd & Tremont Aves., New York, N.Y.

GEORGE ERNEST POTTER, C.E., Div. Eng'r, New York, Chicago & St. Louis R.R., 1231 W. Wayne St., Fort Wayne, Ind.

FREDERICK PUTNAM SPALDING, C.E., Prof. of Civil Engineering, University of Missouri, Columbia, Mo. Res: 901 Virginia Ave.

*LEONARD BLAKESLEE TREHARNE, B.A.

BENJAMIN RUSSELL VANKIRK, M.E., Locomotive Designer, Baldwin Locomotive Works, Philadelphia, Pa. Res: 2105 Green St.

*FREDERICK COPELAND WOOTEN, M.E.

CLASS OF 1881.

WILLIAM SIMON CRANZ, A.C., Purchasing and Development of Mining Property, Nogales, Ariz.

ALEXANDER PATRICK CRILLY, B.A.

THOMAS MORGAN EYNON, M.E., Pres., Eynon-Evans Mfg. Co., 15th & Clearfield Sts., Philadelphia, Pa. Res: 1426 W. Allegheny Ave.

CHARLES WEED GRAY, A.C., Gary, W.Va.

BENJAMIN FRANKLIN HALDEMAN, E.M., Life Insurance, Capital Hotel, Johnstown, Pa.

LEWIS STOCKTON, B.A., Lawyer, 97 Erie Bank Bldg., cor. Niagara & Main Sts., Buffalo, N.Y. Res: cor. North & Franklin Sts.

CLASS OF 1882.

LOUIS OSCAR EMMERICH, E.M., Mining Eng'r, Hazleton, Pa.

CHARLES COMSTOCK HOPKINS, B.S. (Sci.), C.E. ('84), Hydraulic & Sanitary Eng'r, 103 W. Dominick St., Rome, N.Y. Res: 200 W. Garden St.

Elmer Henry Lawall, C.E., Mining Eng'r, Treas., International Text-book Co.; Sec., Diamond Land & Improvement Co., Scranton, Pa.; Consulting Eng'r, American Exploitation Co., Denver, Col.; Pres., Attica Gas, Water & Electric Light Co., Attica, N.Y. Res: 76 W. South St., Wilkes-Barre, Pa.

Robert Thomas Morrow, C.E., Supt., Pittsburg Div., Pennsylvania R.R., Union Station, Pittsburg, Pa. Res: Aspinwall, Pa.

Eugene Ricksecker, C.E., U.S. Asst. Eng'r, 615 Berlin Bldg., Tacoma, Wash. Res: 322 S. L St.

John Dougherty Ruff, E.M., Journalist, with *The Record*, Philadelphia, Pa. Res: 4322 Sansom St.

*Samuel Brenton Sickler, C.E.

*Martin Wittmer, E.M.

CLASS OF 1883.

*Enos Kellar Bachman, E.M.

Walter Briggs, B.A., Attorney-at-Law, 508-9 Board of Trade Bldg., Scranton, Pa. Res: 1505 Jefferson Ave.

Henry Augustus Butler, B.S. (Sci.), Coal, Mauch Chunk, Pa.

Hedley Vicars Cooke, B.A., LL.M. (George Washington Univ.), of Cooke & Forsch, Lawyers, 50 Pine St., New York, N.Y. Res: 16 Prospect Terrace, East Orange, N.J.

*Francis Joseph Crilly, B.A., M.A. ('89).

Francis Wharton Dalrymple, C.E., City Eng'r, City Hall, Bayonne, N.J. Res: 473 Ave. E.

Timothy James Donahue, A.C., Chemist & Metallurgist, Elizabeth, N.J. Res: 908 Grove St.

George Francis Duck, E.M., Consulting Mining Eng'r, 603 Keystone Bldg., Pittsburg, Pa.

Alfred Edmond Forstall, M.E., Consulting Gas Eng'r, 58 William St., New York, N.Y. Res: 156 Midland Ave., Montclair, N.J.

Nathaniel Oliver Goldsmith, M.E., with Weir Frog Co., Norwood, O.; Pres., Ohio Rubber Cement Co., Bellevue, Ky. Res: 2207 Cameron Ave., Norwood, O.

William Theodore Goodnow, C.E., Pres., Cayuta Mfg. Co., Sayre Stamping Co.; Gen. Mgr., Sayre Land & Water Co., Lockhart Bldg., Sayre, Pa. Res: 105 Park Pl.

John Daniel Hoffman, B.A., M.A. ('89), Attorney-at-Law, 15 Broad St., Bethlehem, Pa. Res: 38 Garrison St.

George Gowen Hood, C.E., Mount Airy, Philadelphia, Pa.

Garrett Linderman Hoppes, C.E., Hotel Business, Eagle Hotel, Bethlehem, Pa.

JULIAN DEBRUYN KOPS, B.E. (Univ. of Ga.), C.E., Architect & Civil Eng'r, 18 Board of Trade Bldg., Savannah, Ga. Res: 222 Gwinnett St.

PRESTON ALBERT LAMBERT, B.A., M.A. ('91), Prof. of Mathematics, Lehigh University, South Bethlehem, Pa. Res: 215 S. Centre St., Bethlehem, Pa.

EDWARD FRANCIS MILLER, M.E., with Camden Iron Works, Camden, N.J. Res: 313 Pearl St.

WILSON FRANKLIN MORE, B.A., M.A. ('91), Supt., Bethany Orphans' Home, Womelsdorf, Pa.

NELSON MORROW, M.E., Mgr., Deep Rock Springs, Box 104, Oswego, N.Y. Res: 235 W. 1st St.

THOMAS NICHOLSON, M.E., of Nicholson & Co., Pittsburg Chain Works, Rankin, Pa. Res: Hawkins Station, Swissvale, Pa.

GEORGE SPENCER PATTERSON, E.M., Mining Eng'r, Sec. & Treas., Bottom Creek Coal & Coke Co., Vivian, W.Va.

REMBRANDT RICHARD PEALE, B.S. (Sci), Coal Operator, 1 Broadway, New York, N.Y. Res: St. Benedict, Pa.

HENRY ALLEBACH PORTERFIELD, E.M., Mgr., Dexter Oil Co., Lewis Bldg., Pittsburg, Pa. Res: 5232 Westminster St.

FRANCIS HENRY PURNELL, C.E., E.M. ('86), Clerk of Circuit Court, Worcester Co., Snow Hill, Md.

JESSE WILFORD RENO, E.M., Pres., Reno Inclined Elevator Co., 555 W. 33rd St., New York, N.Y. Res: 684 St. Nicholas Ave.

CHARLES LOOMIS ROGERS, M.E., Pres., Sligo Furnace Co.; Pres., Sligo & Eastern R.R. Co., Syndicate Trust Bldg., St. Louis, Mo. Res: Buckingham Club.

JOHN RUDDLE, M.E., Supt. of Canals and Real Estate, Lehigh Coal & Navigation Co., Mauch Chunk, Pa. Res: East Mauch Chunk, Pa.

CHARLES HENRY STINSON, B.S. (Sci.), Attorney-at-Law, 317 Swede St., Norristown, Pa. Res: 319 Swede St.

*ROBERT STINSON, B.S. (Sci.).

CLASS OF 1884.

ROBERT GRIER COOKE, B.A., Special Publisher, 420 5th Ave., New York, N.Y. Res: 12 W. 44th St.

HENRY BOWMAN DOUGLAS, B.M., E.M. ('85), Mining Eng'r for New York Central & Hudson River R.R., Philipsburg, Pa.

WILLIAM BANKS FOOTE, B.M., E.M. ('85), Bainbridge, N.Y.

HARRY TALLMAN HARPER, C.E., Hotel Seneca, Seattle, Wash.

HARRY HURD HILLEGAS, C.E., Sec. & Mgr., Hercules Paper Bag Co., Reading, Pa. Res: 1413 Perkiomen Ave.

EDWIN FRANKLIN HOFFORD, C.E., Lehighton, Pa.

JOHN ANDREW JARDINE, B.M., E.M. ('85), with Pilling & Crane, 600 Girard Trust Bldg., Philadelphia, Pa.

JAMES WARNER KELLOGG, M.E., Mgr. of Marine Sales, General Electric Co., Schenectady, N.Y. Res: 10 Front St.

DAVID GARRETT KERR, B.M., Ore Agt., Carnegie Steel Co., Pittsburg, Pa. Res: 1102 Centre St., Wilkinsburg, Pa.

FREDERICK BOWMAN LANGSTON, C.E., Architect, 295 Gates Ave., Brooklyn, N.Y.

WILLIAM LANGSTON, C.E., Atlantic Ave. Improvement, Brooklyn, N.Y. Res: 295 Gates Ave.

*ROBERT PACKER LINDERMAN, Ph.B.

*JOSEPH FRANKLIN MERKLE, C.E., M.D. (Univ. of Pa., '94).

HARRY KRIDER MYERS, C.E., Asst. Gen. Mgr., Pittsburg-Buffalo Co., Frick Bldg., Pittsburg, Pa. Res: 1112 Milton Ave., Swissvale, Pa.

ALBINO ROSENDO NUNCIO, M.E., Chief of Industries & Expositions Bureau, Dept. of Public Promotion of Mexico. Address: San Andres 15, Federal Dist., City of Mexico, Mex.

JAMES WARD PACKARD, M.E., Pres., Packard Motor Car Co., Detroit, Mich.; Pres., Packard Electric Co., Warren, O.

*ALFRED SCULL REEVES, B.M., E.M. ('85).

BARRY SEARLE, A.C., Mining, Creighton, Ga.

LEWIS BUCKLEY SEMPLE, B.A., M.A. ('91), Ph.D. (Princeton), Teacher of English, High School, Brooklyn, N.Y.

AUGUSTUS PARKER SMITH, M.E., LL.B. (Georgetown Univ.), Lawyer, U. S. Express Bldg., 2 Rector St., New York, N.Y. Res: Hotel Carlton, 209 W. 54th St.

MURRAY STEWART, M.E., Motive Power Dept., Pennsylvania R.R., Box 202, Delmar, Del.

RICHARD WASHINGTON WALKER, C.E.

JAMES ANGUS WATSON, C.E., of Foster, Freeman, Watson & Coit, Patent Lawyers, McGill Bldg., Washington, D.C. Res: 3301 16th St., N.W.

CLASS OF 1885.

WARREN HOWARD ALLEN, A.C., Teller, Farmers' National Bank, Athens, Pa.

HARRISON LINK AUCHMUTY, C.E., Asst. Eng'r, Pittsburg Coal Co., 232 Fifth Ave., Pittsburg, Pa. Res: 24 S. Emily St., Crafton, Pa.

*THEODORE WELD BIRNEY, C.E.

*Harry Luther Bowman, B.M.

William Harvey Cooke, B.A., M.D., Physician, 10 N. Munn Ave., East Orange, N.J.

William Noble Edson, C.E., of Edson Brothers, General Contractors, Phelps, N.Y.

*John Roberts Engelbert, C.E.

Felix Freyhold, C.E., Civil Eng'r, Bureau of Equipment, Navy Dept., Washington, D.C. Res: 236 1st St., S.E.

Irving Andrew Heikes, B.M., E.M. ('86), First Asst. in Mathematics, Morris High School, 166th St. & Boston Road, New York, N.Y. Res: 1061 Clay Ave.

David Kirk Nicholson, M.E., M.S. ('00), of Nicholson & Co., Pittsburg Chain Works, Rankin, Pa. Res: Hawkins Station, Swissvale, Pa.

*Fayette Brown Petersen, C.E.

John Bertsch Price, C.E., Pres., First National Bank, Hazleton, Pa. Res: 219 N. Laurel St.

Harry William Rowley, M.E., Salesman, Allis-Chalmers Co., 71 Broadway, New York, N.Y. Res: 253 Garfield Pl., Brooklyn, N.Y.

*Elliot Otis Smith, C.E.

Clarence Moncure Tolman, M.E., Electrical & Mechanical Eng'r, with Bangor Ry. & Electric Co., Bangor, Me.

*John R. Wagner, M.E.

James Hollis Wells, C.E., Consulting Eng'r, of Clinton & Russel, Architects, 32 Nassau St., New York, N.Y. Res: Gifford Ave., Jersey City, N.J.

Cabell Whitehead, B.M., M.S. (Columbia Univ.), Ph.D., Mgr., Alaska Banking & Safe Deposit Co., Nome, Alaska.

George Rodney Booth, Ph.B., Attorney-at-Law, cor. Main & Market Sts., Bethlehem, Pa. Res: 410 Market St.

CLASS OF 1886.

Richard Singmaster Breinig, B.S., E.M. ('89), Asst. Eng'r, Union Pacific Ry., 9th & Farnam Sts., Omaha, Neb. Res: 1724 Dodge St.

John Henry Brown, C.E.

Charles Ellsworth Clapp, Ph.B., Attorney-at-Law, 314 Omaha Nat'l Bank Bldg., Omaha, Neb.

George Henry Cobb, M.E., Supt., New York Transit Co., 802 Kilmer Bldg., Binghamton, N.Y. Res: 28 Frederick St.

William Henry Dean, B.M., E.M. ('86), A.C. ('86), Principal, Harry Hillman Academy; Chemist & Biologist, Spring Brook Water Supply Co., Wilkes-Barre, Pa. Res: 167 W. River St.

Frederick William Fink, C.E., Asst. Eng'r, Western Pacific Ry., Safe Deposit Bldg., San Francisco, Cal.

Robert Caldwell Gotwald, C.E., Architect, Gotwald Bldg., Springfield, O.

Lewis John Henry Grossart, C.E., Town Eng'r, Alliance & Catasauqua, Pa.; Civil Eng'r, offices at Allentown and Bethlehem, Pa., 423 Commonwealth Bldg., Allentown, Pa. Res: 503 N. 4th St.

Max S. Hanauer, A.C., Assayer & Chemist; Mgr., Union Assay Office, 152 S. West Temple St., Salt Lake City, Utah. Res: 1111 E. 1st South St.

Solomon Jacob Harwi, C.E., Civil Eng'r for Babcock & Wilcox Co., Bayonne, N.J. Res: 910 Ave. C.

Simeon Cole Hazleton, B.M., E.M. ('87), Supt., United States Smelting Co., West Jordan, Utah.

Mark Antony DeWolfe Howe, B.A., A.B., and A.M. (Harvard), Editor & Writer, *Youth's Companion* Office, 201 Columbia Ave., Boston, Mass. Res: 26 Brimmer St.

Charles Alexander Junkin, C.E., Computer for Artillery Board, Fort Monroe, Va. Res: 350 Fulton St., Hampton, Va.

Guadalupe Lopez deLara, M.E., Consulting Eng'r & Contractor, Priciliano Sanchez 35, Guadalajara, Jalisco, Mexico.

Charles Augustus Luckenbach, B.M., Mgr. of Construction, Los Angeles Gas & Electric Co., 645 S. Hill St., Los Angeles, Cal. Res: 1338 Kellam Ave.

William Anthony Lydon, B.M., E.M. ('87), Pres., Great Lakes Dredge & Dock Co., Chamber of Commerce, Chicago, Ill. Res: 4731 Grand Boul.

Paul Douglass Millholland, C.E., Sales Agt., American Iron & Steel Mfg. Co. of Lebanon, Pa., Harrison Bldg., Philadelphia, Pa. Res: 1153 N. 63rd St.

Henry Gerber Reist, M.E., Mechanical & Electrical Eng'r, General Electric Co., Schenectady, N.Y. Res: 42 Glenwood Boul.

Joseph William Richards, A.C., M.S. ('91), Ph.D. ('93), Prof. of Metallurgy, Lehigh University, South Bethlehem, Pa. Res: University Park.

*George Mann Richardson, A.C., Ph.D. (Johns Hopkins).

*Augustus Stoughton Ross, M.E.

*George Arthur Ruddle, Ph.B.

WILLIAM HEYSHAM SAYRE, JR., M.E., Mgr., International Contracting Co., 17 Battery Place, New York, N.Y. Res: 181 Ridgewood Ave., Glen Ridge, N.J.

JOHN SELMAR SIEBERT, C.E., Architect, Citizen's National Bank Bldg., Cumberland, Md. Res: 50 Cumberland St.

JOHN HENRY SPENGLER, C.E., Asst. City Eng'r, 327 City Hall, Chicago, Ill. Res: 6346 Woodlawn Ave.

EDWIN STANTON STACKHOUSE, B.M., E.M. ('87), General Business, Shickshinny, Pa.

THEODORE STEVENS, B.M., E.M. ('87), Traction Eng'r, British Thomson-Houston Co., 83 Cannon St., London, England.

HARRY EUGENE STOUT, B.S. (in Mining and Metallurgy), with Weston Dodson & Co., Miners & Shippers of Coal, Bethlehem, Pa. Res: 361 Market St.

*JOSEPH KIDDOO SURLS, B.M.

WILLIAM PATTERSON TAYLOR, B. A., Rector of St. Paul's Church, East Orange, N.J.

HARRY TOULMIN, Ph.B., M.D., Asst. Medical Director, Penn Mutual Life Insurance Co., 925 Chestnut St., Philadelphia, Pa. Res: Haverford, Pa.

PRIESTLY TOULMIN, B.M., E.M. ('87), Pres., Lehigh Coal Co., Lehigh, Ala. Res: 2241 Sycamore St., Birmingham, Ala.

CURTIS HUSSEY VEEDER, M.E., Pres., Veeder Mfg. Co., cor. Garden & Sargeant Sts., Hartford, Conn. Res: 40 Willard St.

CLASS OF 1887.

FRANK FIELDING AMSDEN, B.S., E.M. ('89), Mgr., Paxton Iron & Steel Co., Harrisburg, Pa. Res: 215 S. Front St.

ROBERT WEBB BARRELL, B.M., E.M. ('88), General Consulting Eng'r & Metallurgist; Asst. Mgr., St. Louis Sampling & Testing Works; Consulting Eng'r, Mercantile Finance Co. of Chicago; Sec. & Treas., Crescent Mining & Mfg. Co., 1225-1227 Spruce St., St. Louis, Mo. Res: 1464 Botanical Ave.

ALEXANDER BONNOT, C.E., Clerk, Norfolk Warehouse Association, 15th St., Norfolk, Va.

CHARLES AUSTIN BUCK, A.C., Asst. Gen. Supt., Bethlehem Steel Co., South Bethlehem, Pa. Res: 217 Packer Ave.

JULIAN CARTER BUCKNER, M.E.

BENJAMIN AMOS CUNNINGHAM, C.E., Resident Eng'r, New York Central & Hudson River R.R., Buffalo, N.Y. Res: 671 Auburn Ave.

Eugene Diven, M.E., Patent and Corporation Law, of Diven & Diven, Attorneys-at-Law, 212 E. Water St., Elmira, N.Y. Res: 205 College Ave.

Alfred Doolittle, B.A., Rectory, Va.

Francis Rouad Dravo, M.E., Pres., Dravo Contracting Co., 814 Lewis Blk., Pittsburg, Pa. Res: 40 Linden Ave., Sewickley, Pa.

Milton Henry Fehnel, B.S. (Sci.), A.C. ('89), Factory Mgr., Sugar City Factory, Utah-Idaho Sugar Co., Sugar City, Idaho.

Harvey Sheafe Fisher, B.A., B.D. (General Theological Seminary), Rector of St. John's Church, Norristown, Pa.

Kenneth Frazier, B.A., Artist, New York, N.Y. Res: 58 E. 78th St.

*Henry Stevens Haines, M.E.

John Benjamin Hittell, C.E., Chief Eng'r of Streets, Board of Local Improvements, 207 City Hall, Chicago, Ill. Res: 1515 Newport Ave.

John Myers Howard, M.E., Asst. Supt., Latrobe Plant, Railway Steel Spring Co., Latrobe, Pa. Res: 1825 Ligonier St.

Charles Colcock Jones, B.S. (in Mining and Metallurgy), Consulting Mining Eng'r & Metallurgist, 308 Henne Bldg., Los Angeles, Cal. Res: 102 S. Occidental Boul.

William Frederick Kiesel, jr., M.E., Asst. Mechanical Eng'r, Pennsylvania R.R., Altoona, Pa. Res: 2320 Broad Ave.

James Wesson Kittrell, C.E., Manufacturer of Portland Cement, Cementon, N.Y. Res: 23 King St., Catskill, N.Y.

Frederick Hayes Knorr, A.C., with Electric Storage Battery Co., 19th St. & Allegheny Ave., Philadelphia, Pa. Res: 144 School House Lane, Germantown, Pa.

*Samuel Davis Langdon, M.E.

John Walter Ledoux, C.E., Chief Eng'r, American Pipe Mfg. Co., 112 N. Broad St., Philadelphia, Pa. Res: Swarthmore, Pa.

Garrett Brodhead Linderman, Ph.B., Vice-Pres., Lehigh Valley National Bank, Bethlehem, Pa. Res: South Bethlehem, Pa.

Harry Smuller Meily, C.E., Asst. Eng'r, Buffalo & Allegheny Valley Div., Pennsylvania R.R., Buffalo, N.Y. Res: 114 Hodge Ave.

James Alexander Morrow, C.E.

*Henry Benjamin Charles Nitze, B.S., E.M. ('88).

George Francis Pettinos, M.E., of Pettinos Bros., Miners & Refiners of Graphite and Manufacturers of Foundry Facings, Bethlehem, Pa. Res: Delaware Ave., South Bethlehem, Pa.

Robert Henry Phillips, C.E., Mgr., Sandy Spring Ry. Co., 1406 G St., N.W., Washington, D.C.

*Rufus King Polk, B.S., E.M. ('88).

Charles Pope Pollak, C.E., Executive Dept., Fairbanks, Morse, & Co., Monroe & Franklin Sts., Chicago, Ill. Res: 137 W. 4th St.

Mason Delano Pratt, C.E., Consulting Eng'r, 16 S. 2nd St., Harrisburg, Pa. Res: 1100 Green St.

Evan Turner Reisler, C.E., Construction Supt., American Pipe Mfg. Co., Lock Box 11, Belle Vernon, Pa.

George Thomas Richards, C.E., Vice-Pres., Drake & Stratton Co., Pennsylvania Bldg., Philadelphia, Pa. Res: 5870 Drexel Road, Overbrook, Pa.

*John Warwick Scull, M.E.

Frank Stuart Smith, A. C., Special Representative, Westinghouse Companies, 111 Broadway, New York, N.Y. Address: Engineers' Club, 32 W. 40th St.

Elmer Ellis Snyder, C.E., Div. Supt., Louisville Div., Louisville & Nashville R.R., Louisville, Ky. Res: 1862 Brook St.

Harry Harkness Stoek, B.S., E.M. ('88), Editor, *Mines and Minerals*, Scranton, Pa. Res: 809 Quincy Ave.

*Otway Owen Terrell, M.E.

Edward Power VanKirk, B.M., Electrical Eng'r, Westinghouse Air Brake Co., Wildmerding, Pa.

August Julius Wiechardt, M.E., M.M.E. (Cornell, '91), Chief Eng'r & Gen. Mgr., Fuel Engineering Co., 829-833 Williamson Bldg., Cleveland, O. Res: 40 Warren Road, Lakewood, Cleveland, O.

Henry August Julius Wilkens, B.S., E.M. ('88), Mgr., New Jersey Zinc Co., 11 Broadway, New York, N.Y. Res: 142 E. 18th St.

*Frank Williams, B.S., E.M. ('88).

Nissley Joseph Witmer, C.E., Asst. Eng'r, Bureau of Surveys, 4535 Frankford Ave., Philadelphia, Pa. Res: 1532 Harrison St.

*Hampton Woods, B.S. (Sci.), B.M. ('88), E.M. ('89).

*George Frederick Yost, M.E.

Charles F. Zimmele, Ph.B., 155 Winthrop St., Brooklyn, N.Y.

CLASS OF 1888.

Charles Lambert Addison, M.E., Asst. to Pres., Long Island R.R., Long Island City, N.Y. Res: Hempstead, N.Y.

George Reade Baldwin, M.E., Manufacturer, 338 N. 4th St., Philadelphia, Pa.

Charles Lincoln Banks, B.S. (Sci.), M.D., Physician & Surgeon, 254 State St., Bridgeport, Conn.

*Edmund A. Bates, C.E.

William Donaldson Beatty, C.E., 320 Witherspoon Bldg., Philadelphia, Pa.

Hubert Alexander Bonzano, C.E., Civil Eng'r, 331 S. 18th St., Philadelphia, Pa.

William Bradford, C.E., Consulting Eng'r, 909 Empire Bldg., Pittsburg, Pa. Res: 142 S. Negley Ave.

Adolph Theodore Bruegel, M.E., M.M.E. (Cornell, '96), with Hess-Bright Mfg. Co., 21st St. & Fairmount Ave., Philadelphia, Pa.

Otto Cornelius Burkhart, B.S., E.M. ('89), C.E. ('92), Instructor in Mineralogy & Metallurgy, Lehigh University, South Bethlehem, Pa. Res: 9 S. Centre St., Bethlehem, Pa.

Charles Noble Butler, C.E., Attorney-at-Law, Patent, Trademark, & Copyright Cases, 1318 Land Title Bldg., Philadelphia, Pa.

Morton Lewis Byers, C.E., Chief Eng'r Maintenance of Way, Missouri Pacific Ry., General Offices, St. Louis, Mo.

John Jesse Clark, M.E., Mgr., Textbook Dept., International Textbook Co.; Dean of International Correspondence Schools, Wyoming Ave. & Ash St., Scranton, Pa. Res: 919 Sunset Ave.

George Philip Connard, C.E., Dist. Eng'r, Eastern Steel Co., 1310 Pennsylvania Bldg., Philadelphia, Pa.

Reuben Daniels, C.E., with Pittsburg Construction Co., Pittsburg, Pa.

George Herschel Davis, C.E., Gen. Supt. & Eng'r, Vermont Marble Co., Proctor, Vt.

William Schaff Davis, C.E., Treas. & Gen. Mgr., Lebanon Textile Co.; Sec., Lebanon Valley Iron Co., Lebanon, Pa. Res: E. Lehman St.

Philip Hoffecker DeWitt, C.E., of S. B. Mutchler & Co., Contractors & Eng'rs, Phillipsburg, N.J. Res: Weatherly, Pa.

Manuel Victor Domenech, C.E., Civil Eng'r, Ponce, Porto Rico.

George Patterson Dravo, M.E., Pres., Power Improvement Co., 1015 Railway Exchange, Milwaukee, Wis. Res: 297 Farwell Ave.

Charles Wesley Focht, C.E., 15 N. Centre St., Pottsville, Pa.

George Steinman Franklin, M.E., with Steinman Hardware Co., 26-28 W. King St., Lancaster, Pa. Res: 32 S. Prince St.

Samuel Wilson Frescoln, C.E., Civil Eng'r, & Contractor, Reading, Pa. Res: 229 S. 4th St.

Louis Provost Gaston. B.S. (in Mining and Metallurgy), C.E. ('89), of Richards & Gaston, General Contractors, 143 Liberty St., New York, N.Y. Res: 17 Cliff St., Somerville, N. J.

William Gates, jr., C.E., Real Estate Agt., H. C. Frick Coke Co., Carnegie Bldg., Pittsburg, Pa. Res: 332 Mathilda St.

*James Bolan Glover, jr., M.E.

Hughlett Hardcastle, M.E., M.D. (Univ. of Md., '85), Physician, Easton, Md.

George Augustus Hart, M.E., Supt., Latrobe Steel & Coupler Co., Melrose Park, Ill. Res: 420 19th Ave., Maywood, Ill.

Robert Browne Honeyman, B.S. (in Mining and Metallurgy), Attorney-at-Law, United States Express Bldg., 2 Rector St., New York, N.Y. Res: 36 Montgomery Pl., Brooklyn, N.Y.

Sterry Henry Jencks, C.E., 67 Hazlewood Ave., Hazlewood, Pa.

Alfred Eli Lewis, jr., B.S., E.M. ('89), 2151 Florida Ave., N.W., Washington, D.C.

Howard Hale McClintic, C.E., Vice-Pres. & Gen. Mgr., McClintic-Marshall Construction Co., Steel Bridges & Buildings, 1214 Park Bldg., Pittsburg, Pa. Res: 219 S. Fairmount Ave.

Walter Ashfield McFarland, M.E., Supt., Water Dept. of District of Columbia, Washington, D.C. Res: 2000 16th St., N.W.

Howard Loeser McIlvain, A.C., 510 Greenwich St., Reading, Pa.

James Struthers Mack, C.E., Supt., Standard Mines, H. C. Frick Coke Co., Mt. Pleasant, Pa.

Charles Donnell Marshall, C.E., Pres., McClintic-Marshall Construction Co., Box 1594, Pittsburg, Pa. Res: 152 S. Fairmount Ave.

Charles Henry Miller, C.E., Eng'r of River Protection, Missouri Pacific Ry. Co., Gen. Supt.'s Office, Little Rock, Ark.

George Philips Miller, B.A. and M.A. (Bucknell), C. E., Lewisburg, Pa.

*John Hoff Millholland, C.E.

Harlan Sherman Miner, A.C., Chief Chemist, Welsbach Light Co., Gloucester City, N.J. Res: 915 Monmouth St.

Harry Semple Morrow, M.E., Tire Dept., Railway Steel Spring Co., Latrobe, Pa. Res: 1826 Ligonier St.

Daniel Livermore Mott, C.E., of Mott & Kemper, Civil Eng'rs & Contractors, 20 Arcade Bldg., Utica, N.Y. Res: 73 Cornelia St.

William Lynville Neill, B.S. (Lat. Sci.), Attorney-at-Law, with New Domain Oil & Gas Co., Lexington, Ky. Res: 624 Elsmere Park.

HOWARD SEGER NEIMAN, A.C., Manufacturing Chemist, 122 Hudson St., New York, N. Y. Res: 402 W. 153rd St.

*HARRY PALMER, C.E.

CHARLES JEREMIAH PARKER, C.E., Principal Asst. Eng'r, New York Central & Hudson River R.R., Grand Central Station, New York, N.Y. Res: 60 W. 129th St.

ROBERT SWAIN PERRY, A.C., Pres., Harrison Bros. & Co., 3500 Gray's Ferry Road, Philadelphia, Pa. Res: Stokley & Queen Sts., Germantown, Pa.

FRANCIS WILLIAM BIRCHALL PILE, B.S., E.M. ('88), with General Crushed Stone Co., South Bethlehem, Pa. Res: 50 Church St., Bethlehem, Pa.

ALBERT GEORGE RAU, B.S. (Sci.), M.S. ('02), Supt., Moravian Parochial School, Bethlehem, Pa. Res: 63 Broad St.

CLARENCE ELMER RAYNOR, C.E., Asst. Eng'r, Board of Water Supply of New York City, Browns Station, N.Y. Res: 73 Fair St., Kingston, N.Y.

WILLIAM PEMBERTON RICHARDS, C.E., Surveyor of District of Columbia, City Hall, Washington, D.C. Res: 137 S St., N.W.

OSMOND RICKERT, C.E., Parkersburg, W.Va.

WILLIAM RICHARD SATTLER, M.E., Mill Supplies, 10 Barclay St., New York, N.Y. Res: 906 N. Broad St., Elizabeth, N.J.

EUGENE HICKS SHIPMAN, C.E., Asst. Eng'r, Chief Eng'r's Dept., Lehigh Valley R.R., Sayre, Pa.

*WILLIAM ALONZO STEVENSON, M.E.

WYNDHAM STOKES, B.S., E.M. ('89), B.L. (Washington & Lee Univ., '96), Attorney-at-Law, Welch, W.Va.

WILMER MARSHALL WEBB, M.E., Supt., H. T. Paiste Co., 3201 Arch St., Philadelphia, Pa. Res: 130 W. Penn St., Germantown, Pa.

HARVEY MUSSER WETZEL, C.E., Supt., Pennsylvania Coal & Mining Co., Belington, W.Va.

WINTER LINCOLN WILSON, C.E., M.S. ('01), Prof. of Railroad Engineering, Lehigh University, South Bethlehem, Pa. Res: 18 S. New St., Bethlehem, Pa.

EDWARD BENJAMIN WISEMAN, C.E., Asst. Eng'r, Monongahela Div., Pennsylvania R.R., Pittsburg, Pa. Res: Redman Mills, Pa.

SHUNTARO YAMAGUCHI, C.E. (and Imperial Univ. of Tokio, '72), Railway Dept., Mitsui & Co., Tokio, Japan. Res: 2 Fuzimaye Cho, Komagome, Tokio.

LUTHER REESE ZOLLINGER, C.E., Eng'r Maintenance of Way, Pennsylvania R.R., Broad St. Sta., Philadelphia, Pa. Res: 5101 Wynnefield Ave.

CLASS OF 1889.

JAMES WILLOUGHBY ANDERSON, B.S., E.M. ('90), Principal Examiner, U. S. Patent Office, Washington, D.C. Res: 1521 28th St.

*PEARCE ATKINSON, M.E.

GUSTAV AYRES, M.E., Patent Attorney & Consulting Eng'r, 1006 F St., Washington, D.C. Res: Cleveland Park, D.C.

RALPH PUTNAM BARNARD, C.E., LL.M., Attorney & Counselor-at-Law, of Barnard & Johnson, Columbian Bldg., 416 5th St., N.W., Washington, D.C. Res: 1011 O St., N.W.

ALBERT HARLAN BATES, M.E., LL.B. (Ohio State Univ.), Patent Lawyer, of Bates, Fonts & Hull, 1028 Society for Savings Bldg., Cleveland, O. Res: Willoughby, O.

SAMUEL ERWIN BERGER, B.A., M.A. ('93), Prof. of Greek, Central High School, Philadelphia, Pa. Res: 7143 Boyer St., Mt. Airy, Pa.

CHARLES HUDSON BOYNTON, B.S. (Lat. Sci.), Mgr., Eugene Meyer, jr., & Co., Bankers & Brokers, 7 Wall St., New York, N.Y. Res: Corlies Ave., Pelham, N.Y.

*JOSEPH LEANDER BUDD, A.C.

EDGAR CAMPBELL, B.A., Clergyman, Asst. Editor, *Church Standard*, 133 S. 12th St., Philadelphia, Pa. Res: 4742 Kingsessing Ave.

FRANCIS JOSEPH CARMAN, A.C., Oil Operator, 208 Mason Opera House, Los Angeles, Cal. Res: 837 S. Alvarado St.

HERBERT MACKENZIE CARSON, M.E., Asst. to Gen. Mgr., Pennsylvania R.R., 354 Broad St. Station, Philadelphia, Pa.

HOLDEN WILLIAM CHESTER, C.E., Civil Eng'r, Carrollton, Pa.

WILLIAM CORBIN, B.S. (in Mining and Metallurgy), Druggist, Goldfield, Col.

JUSTICE COX CORNELIUS, C.E., Eng'r of Construction, Wm. Wharton, jr., & Co., 25th St. & Washington Ave., Philadelphia, Pa. Res: 405 Wister St., Germantown, Pa.

WILLIAM ALBERT CORNELIUS, M.E., Asst. Mgr., National Dept. of National Tube Co.; in charge of Monongahela Furnaces, National Rolling Mills, Boston Iron & Steel Works, and Republic Iron & Steel Works, McKeesport, Pa. Res: 1121 S. Park St.

CHARLES HERBERT DEANS, C.E., 2nd Vice-Pres., John Monks & Sons, Contracting Eng'rs, 1207 Stephen Girard Bldg., Philadelphia, Pa. Res: Phoenixville, Pa.

CHARLES ESTELL DICKERSON, B.S. (Sci.), M.S. ('05), Vice-Principal, Head of Dept. of Science, Mount Hermon School, Mt. Hermon, Mass.

EMIL DIEBITSCH, C.E., Vice-Pres., John Pierce Co., General Contractors, 90 West St., New York, N.Y. Res: 391 West End Ave.

JOHN WEBSTER DOUGHERTY, B.S. (in Mining and Metallurgy), Gen. Supt., Pennsylvania Steel Co., Steelton, Pa.

RALPH MARSHALL DRAVO, B.S. (in Mining and Metallurgy), Vice-Pres., Dravo Construction Co., 814 Lewis Blk., Pittsburg, Pa. Res: Edgeworth, Pa.

ERNEST HIPOLITE DUVIVIER, A.C., Sugar Machinery and Recording Instruments, 14 Church St., New York, N.Y. Res: 441 W. 21st St.

*WILLIAM DOLLOWAY FARWELL, B.A.

HENRY WILLIAM FRAUENTHAL, A.C., M.D., Physician & Surgeon, 783 Lexington Ave., New York, N.Y.

ARTHUR HUGH FRAZIER, B.A., Diplomatic Service. Address: University Club, New York, N.Y.

FREDERICK LOUIS GRAMMER, B.S., E.M. ('90).

GEORGE WENTZ HARRIS, B.S. (in Mining and Metallurgy), of Harris & Merrill, Civil & Mining Eng'rs, Beckley, W.Va.

LIGHTNER HENDERSON, C.E., of Purdy & Henderson, Civil Eng'rs, 78 5th Ave., New York, N.Y., and 1553 Monadnock Bldg., Chicago, Ill.

CONRAD EGBERT HESSE, B.S. (in Mining and Metallurgy), 508 A St., S.E., Washington, D.C.

CLARENCE WALTER HUDSON, C.E., Consulting Civil Eng'r, of Merriman & Hudson, 45 Broadway, New York, N.Y.

ARCHIBALD JOHNSTON, M.E., Pres., Bethlehem Steel Co., South Bethlehem, Pa. Res: 120 Church St., Bethlehem, Pa.

JOHN STOWER KELLOGG, JR., A.C., Salesman, 1145 Devisadero St., San Francisco, Cal.

JOHN WARE SHARPLESS KERLIN, M.E., with Engineering Corps, New York Central & Hudson River R.R., Fernwood, Pa.

SYLVANUS ELMER LAMBERT, B.A., M.A. ('90), Attorney-at-Law, 1010 Ashland Blk., Chicago, Ill. Res: 3500 Ellis Ave.

JOHN JOSEPH LINCOLN, C.E., Chief Eug'r and Supt., Crozer Land Association; Gen. Mgr., Upland Coal and Coke Co., Elkhorn, W.Va.

JOHN LOCKETT, M.E., Resident Mgr., Tanamo Co., Sagua de Tanamo, Cuba. Res: Troja, Jamaica, B.W.I.

ARTHUR LONG, A.C., Merchant, Box 554, Scranton, Pa.

JOHN JOSEPH MARTIN, C.E., Asst. Topographic Eng'r, Public Works Commission, 177th St. & 3rd Ave., New York, N.Y. Res: 2078 Weigand Pl., Bronx.

*Charles Henry Miller, A.C.

Charles Williams Moffett, M.E., Construction Eng'r, Keasbey & Mattison Co., 182 Purchase St., Boston, Mass.

Richard Henry Morris, jr., B.S. (in Mining and Metallurgy), Mutual Fire Insurance Co., 911 Arcade Bldg., Philadelphia, Pa. Res: 25 W. Upsal St., Germantown, Pa.

William Ellis Morris, A.C., 19th & E Sts., Portland, Ore.

John Thomas Morrow, M.E., E.E. ('99), Mining Operations, 27 Pine St., New York, N.Y. Res: Pelham, N.Y.

Albert Daniel Oberly, C.E., Chief Draftsman, with H. C. Frick Coke Co., Scottdale, Pa.

Joseph Michael O'Malley, A.C., M.D., Physician, 2228 S. Broad St., Philadelphia, Pa.

Robert Henry Eddy Porter, M.E.

Arnold Karthaus Reese, B.S., E.M. ('90), Mgr., Dowlais Cardiff Steel Works, Guest, Keen & Nettlefolds, East Moors, Cardiff, Wales. Res: The Red House, Victoria Road, Penarth, Wales.

*Abraham Lincoln Rogers, M.E.

Charles William Schwartz, jr., M.E., Sec. & Bus. Mgr., Philadelphia Textile Machinery Co., Hancock & Somerset Sts., Philadelphia, Pa. Res: 112 W. Walnut Lane, Germantown, Pa.

Arthur Moult Smyth, B.S., E.M. ('90), 411 High St., Germantown, Pa.

Alfred Walton Stockett, C.E., Mgr., Jupiter Gold Mining Co., Box 27, Germiston, Transvaal, South Africa.

Lester Clark Taylor, C.E., F.C. Central Norte, Cordova, Argentine Republic, S.A.

Augustus Thompson Throop, C.E., of Robbins & Throop, Civil Eng'rs & Contractors, 50-51 Gluck Bldg., Niagara Falls, N.Y. Res: 706 Buffalo Ave.

Charles Prentice Turner, M.E., Eng'r, in charge of No. 5 Open Hearth Plant, Pennsylvania Steel Co., Steelton, Pa. Res: 147 N. 13th St., Harrisburg, Pa.

Clarence Walker, B.S., E.M. ('90), Asst. Supt., Pittsburg & Conneaut Dock Co., Conneaut, O. Res: 377 Main St.

Fritz August Weihe, M.E., Ph.D. (Berlin, '97), Teacher, 1828 N. Capitol St., Washington, D.C.

Walter Earle Weimer, A.C., Sec. & Treas., North Lebanon Shoe Factory, Lebanon, Pa.

Harry Rush Woodall, B.S. (in Mining and Metallurgy), 1st Asst.. Second Survey Dist., 1701 S. Broad St., Philadelphia, Pa. Res: 630 Wood St.

EDWIN AUSTIN WRIGHT, C.E., LL.M. (Columbian Univ.), Patent Attorney for Westinghouse Air Brake Co., Pittsburg, Pa. Res: 136 Beach St., Edgewood Park, Pa.

JOSEPH BODINE WRIGHT, C.E., Private Asst. to Chief Eng'r, James Stewart & Co., 135 Broadway, New York, N.Y.

CLASS OF 1890.

THOMAS C. J. BAILY, JR., C.E., in charge of Construction of Anacostia Bridge, 11th and O Sts., S.E., Washington, D.C. Res: 531 Randolph St., N.W.

FREDERICK RICHARD BARRETT, C.E., Asst. Supt., Norfolk & Western Ry., Bluefield, W.Va.

EDWIN HERBERT BEAZELL, C.E., Gen. Supt., Fort Pitt Bridge Works, Canonsburg, Pa. Res: 224 W. College St.

ADOLPH CARDENAS, C.E., Gen. Supt. & Eng'r, Abengarez Gold Fields of Costa Rica, Tres Amigos Mine, Puntarenas, Costa Rica, C.A.

WILLIAM PHELPS CLEVELAND, A.C., Mgr., Galena Plant, Joplin Separating Co., Galena, Ill.

FRANK RAYMOND COATES, B.S., E.M. ('91), Vice-Pres., Wallace-Coates Engineering Co., 1303 Ellsworth Bldg., Chicago, Ill. Res: 355 Dearborn St.

WARREN SCOTT COPE, C.E., Civil & Mining Eng'r, Lambert, W.Va.

CHARLES ELLERY COXE, B.S., E.M. ('91), Mining Eng'r, Chalchichuites, Yacatucas, Mexico.

JAMES BARLOW CULLUM, A.C., Pottsville, Pa.

JOHN WILLIAM DEMOYER, C.E., Div. Eng'r, Philadelphia & Reading Ry., Tamauqua, Pa.

*CLEMENT HEYSER DETWILER, C.E.

CHARLES EDWARD FINK, C.E., Draftsman & Computer of Special Work, Street Railway Dept., Pennsylvania Steel Co., Steelton, Pa. Res: Camphill, Pa.

*FREDERICK ELMER FISHER, C.E.

FRANK ROBERTS FISHER, C.E., Resident Eng'r, Subway & Elevated Ry. Construction, Philadelphia Rapid Transit Co., 730 Market St., Philadelphia, Pa. Res: 103 E. Stewart Ave., Lansdowne, Pa.

HOWARD AUGUSTUS FOERING, B.S. (Sci.), Principal, Bethlehem Preparatory School, Bethlehem, Pa.

RALPH GOODMAN, C.E., Supervisor, Pennsylvania R.R., Lancaster, Pa.

GEORGE ELLSWORTH GREENE, C.E., Sec. & Treas., Niagara Paper Mills, 231 Genesee St., Lockport, N.Y.

HARRY WALTER HARLEY, M.E., 116 N. Broadway, Gloucester City, N.J.

DAVID GARTH HEARNE, C.E., Pres., Eagle Fluor-Spar Co., Wheeling, W.Va.

*JAMES S. B. HOLLINSHEAD, B.S., E.M. ('91).

*FREDERICK KIDDER HOUSTON, M.E.

WILLIAM VINCENT KULP, C.E., Asst. to Chief Eng'r, Milliken Bros., Eng'rs & Contractors, 11 Broadway, New York, N.Y. Res: 327 W. 124th St.

HENRY MEYERS KURTZ, C.E., Consulting Eng'r, 440 Oley St., Reading, Pa.

HARRY KINZER LANDIS, B.S., E.M. ('91), Associate Editor, *Progressive Age*, 280 Broadway, New York, N.Y. Res: 116 W. 79th St.

THOMAS SMITH LEOSER, A.C., Publisher, *Bonfort's Wine and Spirit Circular*, 78 Broad St., New York, N.Y. Res: 24 Franklin Pl., Morristown, N.J.

JOHN ELMER LITCH, M.E., of Litch & Son, Dealers in Leaf Tobacco, 100 N. Cameron St., Harrisburg, Pa.

CHARLES HERBERT MILLER, A.C., Pres., C. H. Miller Hardware Co., 708 Washington St., Huntingdon, Pa.

GEORGE NAUMAN, JR., C.E., Asst. Eng'r of Construction, Pennsylvania R.R., 406 First National Bank Bldg., Sunbury, Pa.

ROBERT ENGLER NEUMEYER, C.E., Borough Eng'r of Bethlehem and South Bethlehem, Pa. Res: 501 Market St., Bethlehem, Pa.

WILLIAM CASSIDY PERKINS, C.E., Asst. Eng'r, Improvement of Public Highways of State of New York, Box 178, Niagara Falls, N.Y.

ASA EMORY PHILLIPS, C.E., Eng'r, in charge of Sewage Disposal System, Design and Construction, 2nd & N Sts., S.E., Washington, D.C. Res: 212 B St., S.E.

CHARLES PLATT, A.C., Ph.D., M.D., F.C.S. (London), Physician, Prof. of Chemistry & Toxicology, Hahnemann Medical College, Philadelphia, Pa. Res: 3612 Baring St.

ALEXANDER POTTER, C.E., Consulting Hydraulic & Sanitary Eng'r, 143 Liberty St., New York, N.Y. Res: The Ansonia, 73rd St. & Broadway.

EDWARD WILLIAMS PRATT, M.E., Master Mechanic, Lines West of Missouri River, Chicago & Northwestern Ry. Res: 723 E. Huron St., Missouri Valley, Ia.

EDWIN JAY PRINDLE, M.E., LL.M., of Prindle & Williamson, Patent Lawyers of New York & Washington, 220 Broadway, New York, N.Y.

WALLACE CARL RIDDICK, C.E., Prof. of Mathematics & Civil Engineering, North Carolina College of Agriculture & Mechanic Arts, West Raleigh, N.C. Res: Hillsboro Road.

JOHN STOVER RIEGEL, M.E., Paper Manufacturer, 41 Park Row, New York, N.Y. Res: 344 W. 87th St.

JOSEPH EDGAR SANBORN, A.C., Proprietor, Rising City Gas Works, Rising City, Neb.

HENRY JOHN SHERMAN, C.E., of Haines & Sherman, Civil Eng'rs, Masonic Temple, Camden, N.J. Res: 30 Union St., Mount Holly, N.J.

WILLIAM CALVIN SHOEMAKER, C.E., Sec., Treas. & Mgr., Indiana Contracting Co., 2216 Broadway, Indianapolis, Ind.

MICHAEL DRUCH SOHON, A.C., M.S. ('95), Ph.D. (Johns Hopkins), in charge Dept. of Chemistry, Morris High School, New York, N.Y. Res: 1344 Chisholm St.

WILLIAM ALTON STEVENSON, M.E., Mgr., Keystone Drop Forge Co., 1111 Harrison Bldg., Philadelphia, Pa.

THEODORE ALFRED STRAUB, C.E., Vice-Pres. & Gen. Mgr., Fort Pitt Bridge Works, 510 House Bldg., Water & Smithfield Sts., Pittsburg, Pa. Res: Canonsburg, Pa.

FRANCIS DUPONT THOMSON, M.E., Chief Eng'r, Wheeling Mould & Foundry Co., Wheeling, W.Va.

CHARLES COOKMAN TOMKINSON, M.E., Vice-Pres., A. D. Granger Co.; Sec., Oswego Boiler & Engine Co., 90 West St., New York, N.Y. Res: 120 Grove St., Plainfield, N.J.

CLAUDE ALLEN PORTER TURNER, C.E., Consulting Eng'r & Architect, 816 Phoenix Bldg., Minneapolis, Minn. Res: 2677 Lake of Isles Boul.

AARON HOWELL VAN CLEVE, C.E., Eng'r, Niagara Falls Power Co., Canadian Niagara Power Co., and allied companies, Niagara Falls, N.Y. Res: Echota.

JOSÉ RAMON VILLALON Y SANCHEZ, C.E.

SAMUEL DEXTER WARRINER, B.A. (Amherst), B.S., E.M. ('90), Gen. Mgr., Lehigh Valley Coal Co., Wilkes-Barre, Pa.

DAVID THOMAS WILLIAMS, M.E., Mechanical Eng'r, Reading Terminal Power House, 416 Reading Terminal, Philadelphia, Pa. Res: 4102 Locust St.

HERBERT WRIGHT, M.E., Asst. Examiner, Patent Office, Washington, D.C. Res: Kensington, Md.

CLASS OF 1891.

MURRAY BLACHLY AUGUR, E.E., Supt. for Holabird & Roche, Architects, 1618 Monadnock Blk., Chicago, Ill. Res: 1217 Church St., Evanston, Ill.

JAMES EDWIN BOATRITE, C.E., B.A. (S. W. Presbn. Univ.), Gen. Mgr., Guerber Engineering Co., Bethlehem, Pa. Res: 333 Wyandotte St., South Bethlehem, Pa.

JAMES W. BOYD, C.E., Div. Eng'r, Coal Dept., Delaware & Hudson Canal Co., 25 D. & H. C. Co. Depot, Scranton, Pa.

JOHN EMERY BUCHER, A.C., Ph.D. (Johns Hopkins), Associate Prof. of Chemistry, Brown University, Providence, R.I.

JACOB BURR BUCKLEY, E.E., Hardware Merchant, 2113 Jamaica Ave., Richmond Hill, New York, N.Y.

EMANUEL CHAO, C.E., City Eng'r & Contractor, Cienfuegos, Cuba. Res: Santa Cruz 65.

EDWARD HAVILAND COXE, C.E., Gen. Supt., Coal Mines & Coke Ovens, Tennessee Coal, Iron & R.R. Co., Woodward Bldg., Birmingham, Ala. Res: 1026 13th Ave., S.

WARDER CRESSON, M.E., Swarthmore, Pa.

JOHN ROSE DAVIS, C.E., Eng'r, Maintenance of Way, Great Northern Ry., St. Paul, Minn. Res: Merchants' Hotel.

ERIC DOOLITTLE, C.E., Asst. Prof. of Astronomy, University of Pennsylvania, Philadelphia, Pa. Res: Flower Observatory, Upper Darby, Pa.

ALBAN EAVENSON, A.C., of Eavenson & Levering, Wool Scouring, Carbonizing and Combing, 217 Atlantic Ave., Camden, N.J.

JUAN DE LA CRUZ ESCOBAR, M.E., Mechanical Eng'r & Contractor, Mantanzas, Cuba.

WALTON FORSTALL, E.E., Asst. Eng'r of Distribution, United Gas Improvement Co., Broad & Arch Sts., Philadelphia, Pa.

JOHN STILLWELL GRIGGS, JR., M.E., Consulting Eng'r, of Griggs & Holbrook, 3 S. William St., New York, N.Y. Res: Upper Montclair, N.J.

GEORGE SAMUEL HAYES, C.E., LL.M. (New York Univ., '04), Consulting Civil Eng'r, 1123 Broadway, New York, N.Y. Res: 53 Lexington Ave.

JOHN SIDNEY HEILIG, M.E., Draftsman, Carnegie Steel Co., Munhall, Pa. Address: Box 262, Homestead, Pa.

WILLIAM ALBERT HEINDLE, C.E., Asst. Eng'r, J. G. White & Co., 43 Exchange Pl., New York, N.Y. Res: Elizabeth, N.J.

JOHN FRANKLIN HERSH, C.E., Hardware Merchant, 825 Hamilton St., Allentown, Pa. Res: 1248 Hamilton St.

HERMANN VICTOR HESSE, B.S., E.M. ('92), Gen. Supt., Consolidation Coal Co., Frostburg, Md.

PAUL DEPUE HONEYMAN, E.E., Div. Supt. of Construction, New York Telephone Co., 15 Dey St., New York, N.Y. Res: 155 Winthrop St., Brooklyn, N.Y.

JOHN TURNER HOOVER, B.S. (in Architecture), of Hoover, Miller & Co., Contractors, Glen Campbell, Pa. Res: Burnside, Pa.

HAGIME ICHIKAWA, A.C., Imperial Printing Bureau, Tokio, Japan.

ALBERT EDWARD JUHLER, A.C., Mgr. of Sales Dept., London Machine Tool Co. of Hamilton, Ont., Traders' Bank Bldg., Toronto, Ont., Canada. Res: 116 Delaware Ave.

HENRY KEMMERLING, C.E., M.S. ('03), Teacher of Mathematics, Central High School, Scranton, Pa. Res: 2623 N. Main Ave.

HERMANN MERIWETHER KNAPP, C.E., Contracting Mgr., American Bridge Co. of New York, Union Trust Bldg., Cincinnati, O.

FREDERICK CURTISS LAUDERBURN, B.A., Curate, All Saints' Church, Worcester, Mass. Res: 25 William St.

CHARLES MCKNIGHT LEOSER, B.S., E.M. ('92), Editor & Publisher, *Bonfori's Wine and Spirit Circular*, 78 Broad St., New York, N.Y. Res: 66 Harrison St., East Orange, N.J.

JAMES ANDERSON MCCLURG, B.S. (in Metallurgy), Box 302, Economy, Pa.

FRANK ANDERSON MERRICK, E.E., Mgr. of Works, Canadian Westinghouse Co., Hamilton, Canada. Res: 53 Arkledun Ave.

JOHN ZOLLINGER MILLER, E.E., Gen. Mgr. & Supt., Mutual Telephone Co., 19 E. 9th St., Erie, Pa. Res: 416 W. 10th St.

HARRY TIMOTHY MORRIS, M.E., Supt., Saucon Plant, Bethlehem Steel Co., South Bethlehem, Pa. Res: 200 S. High St., Bethlehem, Pa.

PAUL MAYO PAINE, C.E., Associate Editor, *Post Standard*, Syracuse, N.Y. Res: 603 Euclid Ave.

EDWIN ADDAMS QUIER, A.C., Treas., Reading Fire Brick Works, 4th & Canal Sts.; Vice-Pres., *Reading Eagle* Co., 542 Penn St., Reading, Pa. Res: 321 S. 5th St.

WALTER FREEMAN RENCH, C.E., Supervisor, Pennsylvania R.R., Tacony, Philadelphia, Pa.

ROBERT SCHMITZ, C.E., Civil Eng'r, 2012 N. 12th St., Philadelphia, Pa.

ELLIS ANSTETT SCHNABEL, B.A., M.A ('93), Prof. of Latin and Greek, Central High School; Vice-Pres., Bartlett Tours Co., 532 Walnut St., Philadelphia, Pa. Res: 3824 Spring Garden St.

LEIDY RUDY SHELLENBERGER, C.E., Eng'r for Grand Central Station Architects, 314 Madison Ave., New York, N.Y.

IRA AUGUSTUS SHIMER, B.A., M.D. (Univ. of Pa., '97), Asst. Surgeon, U. S. Army; Attending Surgeon, Army Bldg., 39 Whitehall St.,New York, N.Y. Res: 132 W. 47th St.

HORACE THEODORE STILSON, C.E., Civil Eng'r, 2M Dept., Fort St. Philip, La.

R. PAUL STOUT, M.E., Eng'r of Experimental Ordnance, Bethlehem Steel Co., South Bethlehem, Pa. Res: 404 Market St., Bethlehem, Pa.

JAMES EDWARD TALMAGE, A.C., Ph.D., F.R.M.S., F.R.S.E., F.G.S., F.G.S.A., Consulting Geologist & Mining Eng'r, Sharon Blk., Salt Lake City, Utah. Res: 970 First Ave.

WILLIAM SIDNEY TOPPING, B.S. (Lat. Sci.), Ph.G., Farmer, Sagaponack, N.Y.

DOMINGO ANTHONY USINA, C.E., Patent Attorney, 170 Broadway, New York, N.Y. Res: 126 E. 28th St.

ELIAS VANDERHORST, C.E., Consulting Eng'r, 45 Broadway, New York, N.Y. Res: 79 Hillside Ave., Orange, N.J.

GEORGE EDWARD WENDLE, E.E., with Lycoming Electric Co., Williamsport, Pa.

PEYTON BROWN WINFREE, C.E., Resident Eng'r, Lynchburg Gravity Water Supply Construction, Lynchburg, Va.

CLASS OF 1892.

WILLIAM NORTH ROBINS ASHMEAD, B.A., Rector of St. James' Memorial Church, Eatontown, N.J.

*GEORGE W. B. ASMUSSEN, C.E.

ROBERT LIGGET BAIRD, C.E., Eng'r Corps, Pennsylvania R.R., Mifflintown, Pa.

JOSEPH BARRELL, B.S., E.M. ('93), M.S. ('97), Ph.D. (Yale), Asst. Prof. of Geology, Yale University, New Haven, Conn. Res: 85 Avon St.

*JOHN YOUNG BASSELL, JR., B.S., E.M. ('95).

JOHN NEWBAKER BASTRESS, C.E., Contractor, Union Trust Bldg., Harrisburg, Pa.

JOHN MAYALL BEAUMONT, M.E., Teacher of Mathematics, Central High School, Scranton, Pa. Res: 119 S. 7th Ave.

WILLIAM WILLIAMS BLUNT, E.E., Gen. Sales Mgr., British Westinghouse Electric & Mfg. Co., Manchester, England. Res: Highfield, Altrincham, England.

WILLIAM YOUNG BRADY, B.S. (in Architecture), Architect, 722 Lewis Bldg., Pittsburg, Pa. Res: 103 Michigan St.

CHARLES MERRITT CASE, B.S., E.M. ('93), of Whallon, Case & Co., members of New York Stock Exchange, 58 Chamber of Commerce, Minneapolis, Minn. Res: 2118 Pillsbury Ave.

GEORGE PRICE CASE, B.S., E.M. ('93), of Whallon, Case & Co., Stocks, Bonds and Grain, 58 Chamber of Commerce, Minneapolis, Minn. Res: 20 W. Grant St.

PHILIP LOTHROP COBB, C.E., Mechanical Eng'r, with Cleveland Electric Illuminating Co., Cleveland, O. Res: cor. Magnolia & Mistletoe Drives.

FREDERICK ALBERT COLEMAN, C.E., Mgr. & Eng'r, Equipment Dept., J. D. Smith Foundry Supply Co., Cleveland, O. Res: Gates Mills, O.

SAMUEL DEWEY CUSHING, M.E., Mechanical Eng'r for John B. Semple & Co., Sewickley, Pa.

HERMAN HAUPT DAVIS, M.E., with Cramp Ship Yards, Philadelphia, Pa. Res: 255 S. 16th St.

MORGAN DAVIS, JR., B.S. (in Mining), Mining Eng'r, 402-403 Coal Exchange, Scranton, Pa. Res: 426 Adams Ave.

WILLIAM RUSSELL DAVIS, C.E., Chief Bridge Designer, State Eng'r's Office, De Graaf Bldg., Albany, N.Y. Res. 122 S. Pine Ave.

HEBER DENMAN, B.S. (in Mining), Sec. & Treas., Bache & Denman Coal Co., Midland, Ark.

EDWIN DODGE, B.S. (in Metallurgy), Mgr., Wheat Dept., Pillsbury-Washburn Flour Mills Co.; Sec., Acme Grain Co.; Sec., Sterling Elevator Co.; Chamber of Commerce, Minneapolis, Minn. Res: 1902 Park Ave.

PERCIVAL DRAYTON, M.E., with Midvale Steel Co., Philadelphia, Pa. Res: 34 W. Gravers Lane, Chestnut Hill, Pa.

*HENRY S. ECKERT, A.C.

LESTER HALLETT ELY, A.C., 111 Beach St., East Orange, N.J.

GEORGE WASHINGTON ENGEL, B.S., E.M. ('93), Chief Mining Eng'r, Temple Iron Co., Board of Trade Bldg., Scranton, Pa. Res: 1509 Jackson St.

THANLOW GJERTSEN, C.E., Mgr., Standard Building Construction Co., 828 Fulton Bldg., Pittsburg, Pa.

*JOHN ADAMS GRUVER, B.A.

WILLIAM LAWALL JACOBY, M.E., Gen. Mgr., Latrobe Steel & Coupler Co., 1720 Old Colony Bldg., Chicago, Ill.

*ALFRED EMERSON JESSUP, B.S. (in Metallurgy).

JUAN JOSÉ JIMINEZ, C.E., Supt., Bureau of Public Works, San Juan, Porto Rico.

HERMAN EUGENE KIEFER, A.C., M.S. ('94), Ph.D. ('96), Chemist, Edison Portland Cement Co., New Village, N.J. Res: 229 S. 7th St., Easton, Pa.

ROBERT REED KITCHEL, M.E., Mechanical Eng'r, 1318 Land Title Bldg., Philadelphia, Pa. Res: Ridley Park, Pa.

SYLVESTER WELCH LABROT, C.E., Pres., American Creosote Works, New Orleans, La.

HENRY F. LEFEVRE, B.S., E.M. ('93), Consulting Mining Eng'r, care John Hays Hammond, 71 Broadway, New York, N.Y.

ALFRED EMORY LISTER, M.E., Mechanical Eng'r, Coal Dept., Delaware & Hudson Canal Co., 31 D. & H. Depot, Scranton, Pa. Res: Glenburn, Pa.

WILLIAM JOHN LLOYD, E.E., Engineering Dept., British Thompson-Houston Co., Rugby, England. Res: 37 Hillmorton Road.

JOHN TAYLOR LOOMIS, E.E., District Agt., Real Estate Dept., Philadelphia & Reading Ry., Reading Terminal, Philadelphia, Pa. Res: 604 S. 42nd St.

HENRY LEWIS MANLEY, B.S., E.M. ('93), Mining Eng'r, 1010 Boylston Ave., Seattle, Wash.

RAYMOND S. MASSON, E.E., Chief Eng'r & Sec., Electric Operating Construction Co., 49 Wall St., New York, N.Y., and Union Trust Bldg., San Francisco, Cal.

EDWARD JAMES MILLAR, C.E., Civil & Sanitary Eng'r, 17 Masonic Bldg., Wheeling, W.Va.

CHARLES TYLER MOSMAN, E.E., Eng'r, Boston Office, General Electric Co., 84 State St., Boston, Mass. Res: Wolcott Terrace, Winchester, Mass.

*ROBERT BLUM OLNEY, C.E.

HENRY ORTH, JR., B.S., E.M. ('93), Patent Lawyer, 529 7th St., N.W., Washington, D.C. Res: 925 P. St., N.W.

RAMON ECKHART OZIAS, B.S. (in Metallurgy), Assayer, 732 Clinton Ave., Newark, N.J.

FRANK DEWITT RANDOLPH, C.E., Chief Draftsman & Eng'r, Potter Printing Press Co., Plainfield, N.J. Res: 442 W. Front St.

ROBERT SWENK RATHBUN, C.E., Civil & Sanitary Eng'r, 323-325 Commonwealth Bldg., Allentown, Pa. Res: 446 Chew St.

SAMUEL ARTHUR RHODES, E.E., Eng'r of Materials, Chicago Telephone Co., 203 Washington St., Chicago, Ill. Res: 431 N. Pine Ave., Austin, Ill.

JOHN IRA RIEGEL, C.E., Asst. Eng'r, R.R. Dept., Delaware & Hudson Co., 47 Lackawanna Ave., Scranton, Pa. Res: 1641 Monsey Ave.

ANTON SCHNEIDER, C.E.

JOHN BONNER SEMPLE, A.C., Manufacturer of Ordnance, Arrott Bldg., Pittsburg, Pa. Res: Sewickley, Pa.

CASS KNIGHT SHELBY, M.E., Master Mechanic, Elmira & Canandaigua Div., Northern Central Ry., Elmira, N.Y. Res: 405 W. Clinton St.

JAMES CLAUSTEN SHRIVER, C.E., Civil Eng'r, 4 Water St., Cumberland, Md.

PHILIP HENRY WADDELL SMITH, E.E., Asst. Gen. Mgr., Standard Underground Cable Co., Westinghouse Bldg., Pittsburg, Pa. Res: Quaker Valley, Sewickley, Pa.

MICHAEL NELIGAN USINA, E.E., First Asst. Eng'r, U. S. Revenue Cutter Service. Address: care Treasury Dept., Washington, D.C.

LESTER WARREN WALKER, E.E., Gen. Mgr. & Treas., North Platte Electric Light & Power Co., North Platte, Neb.

DAVID HEIKES WHITMER, C.E., of Whitmer & Cocco, Eng'rs & General Contractors, 401 S. 51st St., Philadelphia, Pa.

FREDERICK WITTMAN, A.C., Attorney-at-Law, 610 Hamilton St., Allentown, Pa.. Res: Lanark, Pa.

CHARLES OAKS WOOD, M.E., Treas. & Eng'r, T. B. Wood's Sons Co., Chambersburg, Pa.

BYRON EDGAR WOODCOCK, C.E., with East Broad Top R.R. & Coal Co., Orbisonia, Pa.

CLASS OF 1893.

GEORGE HALDEMAN ATKINS, C.E., with Eastern Steel Co., Pottsville, Pa.

HARRY JACOBS ATTICKS, E.E., 120 Liberty St., New York, N.Y.

HUGH CUNNINGHAM BANKS, C.E.

NOBLE C. BANKS, B.S. (in Metallurgy), Mgr., Black Mountain Mining Co., Magdalena, Soñora, Mexico.

HERMAN RENNER BLICKLE, C.E., Sec. & Chief Eng'r, Fort Pitt Bridge Works, 510 House Bldg., Pittsburg, Pa.

WILLIAM IRVIN BOYD, C.E., Asst. Eng'r, Surveyor's Office, City Hall, Washington, D.C. Res: 1447 Chapin St.

FREDERICK EDGAR BRAY, C.E., Structural Eng'r, Pittsburg Cold Rolled Steel Co., Pittsburg, Pa. Res: 227 Fisk St.

GILBERT FORBES BURNETT, B.S. (Sci.), Clerk, U. S. Appraiser's Office, New York, N.Y. Res: Pequannock, N.J.

GEORGE EDWIN CHAMBERLAIN, A.C., Chairman of Operating Committee, Corn Products Refining Co., 1811 Heyworth Bldg., Chicago, Ill. Res: 203 S. Waiola Ave., La Grange, Ill.

WARREN FELLMAN CRESSMAN, C.E., Resident Eng'r, Pennsylvania State Highway Dept., National Bank Bldg., Allentown, Pa. Res: Sellersville, Pa.

WALTER JOSEPH DECH, B.A., Prof. of Greek, Albright College, Myerstown, Pa.

CHARLES MALCOLM DOUGLAS, B.A., Rector of Christ Church, Short Hills, N.J.

CHARLES HAZARD DURFEE, E.E., Banking, Real Estate & Insurance, 60 Bedford St., Fall River, Mass. Res: 807 High St.

BERNARD ENRIGHT, A.C., Chemist, St. Louis Portland Cement Co., St. Louis, Mo. Res: 3931a Greer Ave.

HENRY BROWN EVANS, M.E., Ph.D. (Univ. of Pa., '01), Asst. Prof. of Mathematics, University of Pennsylvania, Philadelphia, Pa. Res: 4126 Chester Ave.

GEORGE HARWOOD FROST, M.E., B.S. (McGill Univ., '96), Editor & Publisher, *Engineering Digest;* Mgr., Book Dept., *Engineering News*, 220 Broadway, New York, N.Y. Res: 508 Woodland Ave., Netherwood, N.J.

FREDERICK PARDEE FULLER, E.E., Pres., Yonkers Specialty Co., Telephone & Electrical Supplies, 23 N. Broadway, Yonkers, N.Y. Res: 433 Palisade Ave.

ROBERT FOSTER GADD, C.E., Contracting Eng'r for Levering & Garrigues, 552 W. 23rd St., New York, N.Y. Res: 11 Columbia St., Hartford, Conn.

CHARLES WILLITS GEARHART, E.E., with H. W. Johns Manville Co., 100 William St., New York, N.Y. Res: 628 W. 114th St.

HARVEY HARTZELL GODSHALL, A.C., Sec. & Treas., Arizona-Mexican Mining & Smelting Co., Haas Bldg., Allentown, Pa. Res: Lansdale, Pa.

SAMUEL LAURY GRAHAM, A.C., Pres. & Gen. Mgr., Rome Testing Laboratory, Rome, Ga.

LEE STOUT HARRIS, C.E., of Fine & Harris, Eng'rs & Contractors, 524 Land Title Bldg., Philadelphia, Pa. Res: 918 Farragut Terrace.

CLAUDE SANFORD HAYNES, C.E., Asst. Eng'r, Katonah Div., Aqueduct Commissioners of New York City, Box 219, Katonah, N.Y.

Richard Willis Heard, E.E., Pres., Heard Lumber Co., 106 Bay St., E., Savannah, Ga. Res: 711 Lincoln St.

Robert Culbertson Hayes Heck, M.E., Prof. of Experimental Engineering, Lehigh University, South Bethlehem, Pa. Res: 819 St. Luke's Place.

Charles Lincoln Keller, M.E., First Asst. Eng'r, Scherzer Rolling Lift Bridge Co., 1616 Monadnock Blk., Chicago, Ill. Res: 5427 Jefferson Ave.

Schuyler Brush Knox, C.E., Eastern Agt., Fort Pitt Bridge Works, 45 Broadway, New York, N.Y. Res: 169 Columbia Heights, Brooklyn, N.Y.

Frank Sigismund Loeb, A. C., Columbia, Pa.

Hiram Dryer McCaskey, B.S. (in Mining), M.S. ('07), Asst. Geologist, U. S. Geological Survey, Washington, D.C. Res: The Bancroft.

Charles Louis McKenzie, C.E., Pres., Pittsburg Construction Co., General Contractors, 808 Diamond Bank Bldg., Pittsburg, Pa. Res: 218 Craig St.

William Price Marr, E.E., Sec. & Treas., Brown Corliss Engine Co., Corliss, Wis. Res: 902 Lake Ave., Racine, Wis.

Archibald Stewart Maurice, C.E., Athens, Pa.

George Holbrooke Maurice, C.E., Civil Eng'r; Water Supply & Sewerage Systems, Reinforced Concrete Structures, Steel Bridges & Roofs, 5-7 E. 42nd St., New York, N.Y. Res: Lawrence Park, Bronxville, N.Y.

James Edgar Miller, M.E., with Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: 316 East End Ave.

William Frederick Mylander, C.E., Real Estate, 516 Law Bldg., Baltimore, Md.

Clinton Ledyard Olmsted, C.E., Asst. to Asst. Eng'r, Allegheny Div., Pennsylvania R.R., Room 503, 1013 Penn Ave., Pittsburg, Pa. Res: Parnassus, Pa.

Charles Joseph O'Neill, E.E., Attorney-at-Law, Patents and Patent Cases; of Pennie, Goldsborough & O'Neill, McGill Bldg., Washington, D.C. Res: 910 Massachusetts Ave., N.E.

Nathaniel Montgomery Osborne, jr., C.E., Lambert's Point Towboat Co., 171 Freemason St., Norfolk, Va.

Charles William Parkhurst, E.E., Supt., Electrical Dept., Cambria Steel Co., Johnstown, Pa. Res: 342 Luzerne St., Westmont, Johnstown, Pa.

Duncan White Patterson, M.E., Mechanical Eng'r, representing Chaplin Fulton Mfg. Co., and Wm. B. Scaife & Sons Co., of

Pittsburg, Pa., Harrison Bldg., Philadelphia, Pa. Res: 1121 S. 48th St.

JOHN GATES PECK, C.E., Asst. Chief Bridge Designer, State Eng'r's Office, DeGraaf Bldg., Albany, N.Y. Res: 107 N. Allen St.

RAYMOND BERNARD FITZ RANDOLPH, A.C., Director, State Laboratory of Hygiene, Trenton, N.J. Res: 831 Carteret Ave.

JOHN GRAHAM REID, C.E., Chief of Surveys, Philadelphia Rapid Transit Co., 820 Dauphin St., Philadelphia, Pa. Res: 2608 Douglas St.

EDWIN CLARK REYNOLDS, C.E., Asst. Examiner, Room 325, U.S. Patent Office, Washington, D.C.

FRANCIS EVANS RICHARDS, C.E., Planter, Bonef, Chicot Co., Ark.

GEORGE WILLIAM RITCHEY, B.S. (Lat. Sci.), Sales Dept., Carnegie Steel Co., Pittsburg, Pa. Res: 426 S. Lang Ave.

FREDERICK BRITTAIN SAGE, E.E., with F. E. Idell, 26 Cortlandt St., New York, N.Y. Res: 104 Berry St., Hackensack, N.J.

*MARTIN LUTHER SALISBURY, C.E.

JOSEPH A. SCHLOSS, A.C., Public Assayer & Chemist, Apartado 65, Monterey, Mexico. Res: 24 Calle de Zaragoza.

ARMIN SCHOTTE, C.E., Consulting Eng'r, 126 Liberty St., New York, N.Y.

WILLIAM FREDERICK SEMPER, A.C., Supt. of Lead Works, McDougall White Lead Co., Buffalo, N.Y. Res: 876 Michigan St.

ALEXANDER BEATTY SHARP, B.S. (in Metallurgy), Treas., Ohio Foundry & Mfg. Co., Steubenville, O. Res: 304 Clinton St.

NOEL W. SMITH, C.E., Asst. Eng'r, Middle Div., Pennsylvania R.R., Altoona, Pa. Res: 966 17th St.

EDWARD AUGUSTE SOLELIAC, B.S. (in Metallurgy), Mgr., Adelaide Mills, Phoenix Silk Mfg. Co., Allentown, Pa. Res: 146 N. 4th St.

GEORGE STERN, B.A., LL.B. (Harvard), Frostburg, Md.

WILLIAM REMICK STEINMETZ, E.E., Electrical Eng'r, Single Phase Traction, Anomyme Westinghouse, Havre, France. Res: Hotel Moderno, Bergano, Italy.

THOMAS HARRISON SYMINGTON, M.E., Pres., T. H. Symington & Co., Railway Supplies; Pres., Baltimore Railway Specialty Co., Sexton Bldg., Baltimore, Md.

JOHN TAYLOR, A.C., Asst. Mgr., St. Louis Portland Cement Dept., Union Sand & Material Co., Liggett Bldg., St. Louis, Mo. Res: 4342 Delmar Ave.

LEWIS ESLER TROUTMAN, E.E., Supply Engineering Dept., General Electric Co., Schenectady, N.Y. Res: 217 Victory Ave.

FREDERICK CONOVER WARMAN, C.E., United States Asst. Eng'r, 1000 22nd St., N.W., Washington, D.C. Res: 3343 17th St., N.W.

CLASS OF 1894

*WILLIAM A. ALLGAIER, B.S., E.M. ('95).

WILLIAM CONKLIN ANDERSON, E.E., Gen. Mgr., Wyoming Valley Gas & Electric Co., Plymouth, Pa. Res: 430 S. Franklin St., Wilkes-Barre, Pa.

GEORGE WASHINGTON SCOTT BATON, B.S. (in Mining), of Geo. S. Baton & Co., Civil & Mining Eng'rs, 1311-14 Keystone Bldg., Pittsburg, Pa. Res: 134 Graham St.

IRVIN ISAAC BEINHOWER, M.E., Supt., Lincoln Iron Works, Rutland, Vt. Res: 49 N. Main St.

THOMAS JOSEPH BRAY, JR., M.E., Vice-Pres., Republic Iron & Steel Co., Frick Bldg. Annex, Pittsburg, Pa. Res: 334 S. Dallas Ave.

LAWRENCE CALVIN BRINK, C.E., Div. Eng'r, Wallkill Div. of Catskill Aqueduct, Board of Water Supply of New York City, Hasbrouck Bldg., New Paltz, N.Y.

REZEAU BLANCHARD BROWN, M.E., Eng'r, with Milwaukee Gas Light Co., 182 Wisconsin St., Milwaukee, Wis. Res: 445 Cass St.

EMOTT DAVIS BUEL, C.E., 26 Cortlandt St., New York, N.Y. Res: 36 E. 49th St.

JAMES LINDSEY BURLEY, C.E., Landscape Architect, 29 Broadway, New York, N.Y. Res: 412 West End Ave.

WILLIAM COLWELL CARNELL, A.C., Chemist, Tacony Chemical Works, Bridesburg, Philadelphia, Pa. Res: 2136 N. Camac St.

THOMAS FRANCIS CARROLL, B.S. (Lat. Sci.).

ALDEN BROWN DIVEN, C.E., Sec. & Treas., Vilas-Diven Co., Elmira, N.Y. Res: 957 Lake St.

WALTER JULES DOUGLAS, C.E., Eng'r of Bridges, District of Columbia, District Bldg., Washington, D.C. Res: 1855 Calvert St.

WALTER SEWELL DUNSCOMB, C.E., 498 E. 105th St., Cleveland, O. Res: 7 Isham Court.

THADDEUS PERCIVAL ELMORE, C.E., Engineering Dept., American Bridge Co., 42 Broadway, New York, N.Y.

THEODORE GWATHMEY EMPIE, E.E., Cross Ties, Timber & Lands, Allen Bldg., Wilmington, N.C. Res: 309 Ann St.

FRANK FAUST, E.E., Supt., Car Dept., American Car & Foundry Co., Berwick, Pa. Res: 331 Market St.

James DuBose Ferguson, C.E., Asst. Train Master, Buffalo & Rochester Div., and Buffalo & Allegheny Valley Div., Pennsylvania R.R., Olean, N.Y.

Robert Ferriday, C.E., Eng'r Maintenance of Way, Cleveland, Cincinnati, Chicago & St. Louis Ry., cor. Delaware & South Sts., Indianapolis, Ind. Res: 1903 Talbott Ave.

Richard Daniel Floyd, A.C., Bayonne, N.J.

John Jacob Frank, E.E., Designing Eng'r, Transformer Dept., General Electric Co., Schenectady, N.Y. Res: 107 Elmer Ave.

Luther Lay Gadd, E.E., Eng'r & Sec., Levering & Garrigues, 552 W. 23rd St., New York, N.Y. Res: 1 W. 30th St.

Frank Wiseman Glading, M.A. (Phila. Central High School), M.E., M.S. (Cornell), with Westinghouse Electric & Mfg. Co., Philadelphia, Pa. Res: 890 N. 25th St.

Milton Brayton Graff, A.C., Chief Chemist, Proctor & Gamble Co., Kansas City, Mo. Res: 3935 Terrace St.

Elwood Aristides Grissinger, E.E., Pres., Automatic Chain Co., Buffalo, N.Y. Res: 293 Lexington Ave.

Bayard Guthrie, M.E., Supt., Crucible Steel Co. of America, 35th St. & Allegheny Valley R.R., Pittsburg, Pa. Res: 256 S. Highland Ave., E.E.

William McCleery Hall, M.A. (Franklin and Marshall), C.E., Master of Mathematics, Yeates School, Lancaster, Pa. Res: 30 W. King St.

Fletcher Dickerman Hallock, E.E., Engineering Dept., Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: 405 Whitney Ave., Wilkinsburg, Pa.

Arthur Williston Henshaw, E.E., with General Electric Co., Schenectady, N.Y. Res: 750 Nott St.

Anton Yost Hesse, C.E., 56 Albion Pl., Port Richmond, N.Y.

Foster Haven Hilliard, C.E., Monroe, N.C.

William Emley Holcombe, E.E., Engineering Dept., General Electric Co., Schenectady, N.Y. Res: 826 State St.

Matthias Harry Holz, M.E., Philadelphia Electrical Bureau, 620 City Hall, Philadelphia, Pa. Res: 1901 N. 11th St.

Alfred A. Howitz, M.E., Box 624, Newport News, Va.

George Washington Hunsicker, A.C., Asst. Supt., American Cement Co., Egypt, Pa. Res: 138 N. 8th St., Allentown, Pa.

George Cass Hutchinson, M.E., Pres., Realty Securities Co., 25 Broad St., New York, N.Y. Res: 43 W. 32nd St.

Arthur Bacon Jones, A.C., Supt., Laurel Hill Works of General Chemical Co., Laurel Hill, N.Y. Res: 9th St., Garden City, N.Y.

Barry Holme Jones, B.S., E.M. ('95), Sec. & Treas., Bethlehem Steel Co., South Bethlehem, Pa.

William Harrison Kavanaugh, M.E., Prof. of Experimental Engineering, University of Minnesota, Minneapolis, Minn. Res: 118 State St., S.E.

Richard Warren Knight, C.E., Contracting Eng'r, with McClintic-Marshall Construction Co., Park Bldg., Pittsburg, Pa. Res: Swissvale, Pa.

Claude Averett Langdon, C.E., 1312 Kittatinny St., Harrisburg, Pa.

Harry Donaldson Leopold, C.E., Asst. Resident Eng'r, Brooklyn Heights R.R. Co., 168 Montague St., Brooklyn, N.Y.

James Edwin Little, M.E., Mechanical Eng'r, Spanish American Iron Co., Steelton, Pa. Res: 347 Spruce St.

*Clarence Oliver Luckenbach, M.E.

*Matthew McClung, jr., B.S. (in Metallurgy).

John Douglas McPherson, E.E., Asst. Eng'r, United R.R. Co., Oak & Broderick Sts., San Francisco, Cal. Res: 991 Valencia St.

John VanSickle Martenis, M.E., Instructor in Machine Design, University of Minnesota, Minneapolis, Minn.

Joseph Oscar Mathewson, B.S. (in Metallurgy), Sec. & Treas., Ashland Milling Co., Ashland, Ky. Res: 122 W. Central Ave.

*William Spencer Merrill, B.A., LL.B. (Cincinnati Law School).

Walter Hurxthal Miller, M.E., Vice-Pres., Western Paper Goods Co., 6th & Baymiller Sts., Cincinnati, O. Res: 1 The Rutland, Clifton, Cincinnati, O.

Charles Asher Moore, E.E., Hammonton, N.J.

Julius Lederer Neufeld, E.E., Prof. of Mathematics, Central High School, Philadelphia, Pa. Res: 1441 N. 16th St.

Carl William Frederick Neuffer, C.E., Mining Eng'r, Pennsylvania Coal Co., Dunmore, Pa. Res: Plainsville, Pa.

Charles Atwood Newbaker, E.E., Chief Electrical Eng'r of Arequipa, Peru. Address: Ceorreo, Casilla 154.

Richard Leslie Ogden, A.C., Inspector of Engineering Material for U. S. Navy, Room 21, Post Office Bldg., Harrisburg, Pa.

Jeremiah Francis O'Hearn, C.E., Shenandoah, Pa.

GODWIN ORDWAY, B.S. (in Metallurgy), Capt. Coast Artillery Corps, U. S. Army. Address: care Adjutant General, U. S. A., Washington, D.C.

WILLIAM ARTHUR PAYNE, B.S. (in Architecture), Architect, 345 5th Ave., New York, N.Y.

WILLIAM VAUGHAN PETTIT, B.S. (in Metallurgy), Mining Eng'r, Parral, Chihuahua, Mexico.

STEPHEN COLLINS POTTS, A.C., Asst. Chemist, in charge of South Altoona Laboratory, Pennsylvania R.R., Altoona, Pa. Res: 2413 Broad Ave.

THOMAS CHARLES RODERICK, E.E., Asst. Supt., Grand Rapids Ry. Co., Grand Rapids, Mich. Res: 119 Auburn Ave.

FRANK WILLIAM ROLLER, M.E., Electrical Eng'r & Contractor, 203 Broadway, New York, N.Y.

CHARLES BEECHER RUTTER, B.S. (in Mining), Asst. Eng'r, Lehigh Coal & Navigation Co., Lansford, Pa.

HERMAN SCHNEIDER, B.S. (in Architecture), Dean, College of Engineering; Prof. of Civil Engineering, University of Cincinnati, Cincinnati, O. Res: 6, The Roslyn, Clifton, Cincinnati, O.

BENJAMIN FERDINAND SCHOMBERG, M.E., Draftsman, Mechanical Eng'r's Office, Pennsylvania R.R., Altoona, Pa. Res: 2624 7th Ave.

EDGAR ERNEST SEYFERT, C.E., Structural Eng'r, Broad St. Subway, Philadelphia Rapid Transit Co., 820 Dauphin St., Philadelphia, Pa. Res: 1229 S. 47th St.

GEORGE ELWOOD SHEPHERD, E.E., of Shepherd & Rust, Electrical Eng'rs & Contractors, 42 W. Market St., Wilkes-Barre, Pa. Res: 513 S. Franklin St.

CHARLES ELDER SHIPLEY, E.E.

ROBERT EUGENE SMITH, M.E., Instructor in Mechanical Drawing & Machine Design, University of Pennsylvania, Philadelphia, Pa. Address: care J. E. Gapp, Box 66, Yeadon, Pa.

*HERBERT RIDLEY STRATFORD, A.C.

WALTER CHRISTIAN SWARTZ, M.E., Manufacturer of Furniture, 525 Turner St., Allentown, Pa.

FREDERICK GEORGE SYKES, E.E., Gen. Mgr., Portland General Electric Co., 1st & Alden Sts., Portland, Ore. Res: 826 Kearney St.

CHARLES HAMILTON THOMPSON, B.S. (in Metallurgy), E.M. ('03), Gen. Mgr., Windrock Coal & Coke Co., Windrock, Tenn.

PHILIP HENRY TROUT, JR., E.E., Electrical Eng'r, Staunton, Va.

Orson William Trueworthy, M.E., Naval Architect, U. S. Navy Yard, New York, N.Y. Res: 351 W. 71st St.

Clarence Porter Turner, E.E., Power & Mining Engineering Dept., General Electric Co., Schenectady, N.Y. Res: 1205 State St.

Charles W. Underwood, E.E., Mgr., Westinghouse Electric & Mfg. Co., 782 Ellicott Sq., Buffalo, N.Y. Res: 80 Norwood Ave.

Jacob Daniel vonMaur, C.E., Supt. of Distribution, Laclede Gas Light Co., 716 Locust St., St. Louis, Mo. Res: 4446 Laclede Ave.

Edward Olmsted Warner, E.E., Representative, Latrobe Steel & Coupler Co., 1200 Girard Bldg., Philadelphia, Pa. Res: Haverford, Pa.

Ruel Chaffee Warriner, B.S. (in Mining), Mining Eng'r, with Rand Mines, Box 1056, Johannesburg, Transvaal, South Africa.

Aubrey Weymouth, C.E., Chief Draftsman, Post & McCord, 44 E. 23rd St., New York, N.Y. Res: 441 Amity St., Flushing, N.Y.

Thomas William Wilson, C.E., Gen. Mgr., International Ry. Co., 808 Ellicott Sq., Buffalo, N.Y. Res: 548 Franklin St.

Welden Burris Wooden, C.E., Publisher & Printer, Hampstead, Md.

CLASS OF 1895.

Herman Leon Arbenz, C.E., Civil & Mining Engineer for Ohio County, 1505 Chapline St., Wheeling, W.Va. Res: Pleasant Valley.

Chester Terrill Ayres, E.E., Sec., Indiana Natural Gas & Oil Co., 115 Dearborn St., Chicago, Ill. Res: 4843 Madison Ave.

Franklin Baker, jr., B.S. (in Mining), Manufacturer, 700 N. Delaware Ave., Philadelphia, Pa. Res: 234 W. Horter St., Germantown, Pa.

Clarence Kemble Baldwin, M.E., Chief Eng'r, Robins New Conveyor Co., 1240 Old Colony Bldg., Chicago, Ill. Res: 5427 Jefferson Ave.

Anthony Francis Bannon, jr., C.E., City Eng'r, City Bldg., Bradford, Pa. Res: 49 Walker Ave.

John Collinson Barber, C.E., Civil & Mining Eng'r, Ketchikan, Alaska.

Robert Josiah Bartholomew, M.E., Chief Draftsman and Mechanical Eng'r, Schaum & Uhlinger, Glenwood Ave. & 2nd St., Philadelphia, Pa. Res: 1613 Huntingdon St.

ROLLIN CALVERT BASTRESS, C.E., Engineering Dept., Berlin Plant, American Bridge Co., East Berlin, Conn.

HARRY WILBER BEACH, M.E., Manufacturer of Wood-working Machinery, Montrose, Pa.

GEORGE WALLACE BEGGS, JR., C.E., Instructor in Mathematics, Boys' High School, Reading, Pa. Res: 113 Douglass St.

JOHN HENRY BEST, C.E., Pres. & Gen. Mgr., Best Construction Co., 205 Colman Block, Seattle, Wash. Res: 351 17th Ave. N.

ERNEST MAR BLEHL, E.E., M.A. (Philadelphia High School), A.I.S., A.A.S., Actuary, Philadelphia Life Insurance Co., 1214 North American Bldg., Philadelphia, Pa. Res: 1520 Euclid Ave.

WILLIAM BOWIE, B.S. (Trinity, '93), C.E., M.A. (Trinity, '07), Asst., U. S. Coast & Geodetic Survey, Washington, D.C. Res: 1721 Riggs Pl.

CHARLES SUMNER BRICKER, M.E., General Piece Work Inspector, Chicago, Burlington & Quincy Ry. Lines West of Missouri River. Res: 336 S. 13th St., Lincoln, Neb.

ROBERT BRUCE BRINSMADE, B.S. (Washington Univ., St. Louis), E.M., Director, State Mining Trade School, Platteville, Wis.

JAMES EMERY BROOKS, M.E., Consulting Eng'r, 45 Broadway, New York, N.Y. Res: Glen Ridge, N.J.

EUGENE CLARE BROWN, E.E., Attorney-at-Law, Patent Cases, McGill Bldg., Washington, D.C. Res: 3115 13th St., N.W.

WALTER TURPIN BROWN, C.E., Structural Eng'r, American Bridge Co., New York, N.Y. Res: 86 Jaggar Ave., Flushing, N.Y.

WILLIAM HENRY BROWN, B.S., E.M. ('96), Supervisor, Philadelphia & Reading Ry., Pine Grove, Pa. Res: Hotel Pennsylvania.

JAMES HODGSON BUDD, C.E., Traveling Eng'r, Special Street Ry. Work, 1030 Witherspoon Bldg., Philadelphia, Pa. Res: 512 W. 11th St., Wilmington, Del.

CHARLES CALVIN BURGESS, C.E., Eng'r, Pittsburg Construction Co., Diamond Bank Bldg., Pittsburg, Pa. Res: 420 Lloyd St.

JOHN THOMAS CALLAGHAN, JR., B.S., E.M. ('96), U. S. Asst. Inspector, Penn Steel Casting Co., Chester, Pa. Res: 613 W. 7th St.

FRANCIS LEE CASTLEMAN, C.E., Asst. to Resident Eng'r, American Bridge Co., 44 Broadway, New York, N.Y.

ROBERT EDES CHETWOOD, JR., E.E., Telephone Eng'r, American Telephone & Telegraph Co., 15 Dey St., New York, N.Y. Res: 415 N. Broad St., Elizabeth, N.J.

ARTHUR STEBBINS CLIFT, M.E., Sales Mgr., Power & Mining Dept., Siemens Bros. Dynamo Works, York Mansion, York St., Westminster, London, S. W., England.

WILLIAM WHEELER COLEMAN, B.S. (in Metallurgy), Works Mgr., Bucyrus Co., South Milwaukee, Wis. Res: 337 Prospect Ave., Milwaukee, Wis.

WILLIAM JOSEPH COLLIER, C.E., Industrial Eng'r. B. & C. Dept., Pennsylvania Steel Co., Steelton, Pa. Res: 355 Swatara St.

MORRIS LLEWELLYN COOKE, M.E., Manager, Walnut Lane & Wayne Ave., Germantown, Pa.

HERBERT MAURICE CRAWFORD, C.E., Gen. Mgr., Midland Coal & Coke Co., Philippi, W.Va.

HENRY M. S. CRESSMAN, B.A., M.A. ('01), Supt. of Schools, Egg Harbor City, N.J.

HOWARD STEPHEN DECK, M.E., of Woolson-Deck Co., Industrial Contractors & Eng'rs, 26 Cortlandt St., New York, N.Y. Res: Wayne, N.J.

HENRY DEHUFF, E.E., Sec., D'Olier Engineering Co., 121 S. 11th St., Philadelphia, Pa. Res: Llanfair Ave. & Pembroke Road, Cynwyd, Pa.

STANLEY CHIPMAN DEWITT, E.E., Supt., Windsor, Essex & Lake Shore Rapid Ry. Co., Kingsville, Ontario, Canada.

JAMES CHAMBERS DICK, C.E., 515 W. 4th St., Reno, Nev.

BEEKMAN DUBARRY, JR., M.E., Highland Falls, N.Y.

HOWARD ECKFELDT, B.S., E.M. ('96), Prof. of Mining Engineering, Lehigh University, South Bethlehem, Pa. Res: 438 Seneca St.

ALFRED WILLIAM ALEXANDER EDEN, C.E., Structural Steel Designer, Berlin Construction Co., Kensington, Conn. Res: 56 Bassett St., New Britain, Conn.

*EDWARD L. FAISON, JR., C.E.

GUY HECTOR FARMAN, B.S. (in Metallurgy), Westfield, Vt.

EDWARD CALVIN FERRIDAY, B.A., Mgr., Contractors' Div., E. I. duPont de Nemours Powder Co., Drawer 1001, Wilmington, Del. Res: 1210 Delaware Ave.

WALTER FERRIS, M.E., Asst. Chief Eng'r, Bucyrus Co., South Milwaukee, Wis. Res: 710 Prospect Ave., Milwaukee, Wis.

*GEORGE LANE GABRIO, E.E.

ANDRÉS GARZA GALÁN, C.E., Coal Mining, Box 137, Hidalgo 24, Monterey, N. L., Mexico.

EDUARDO ANTONIO GIBERGA Y GALE, M.E.

JOHN JAMESON GIBSON, E.E., Mgr., Philadelphia Office, Westinghouse Electric & Mfg. Co., 705 Land Title Bldg., Philadelphia, Pa. Res: Cresheim Arms, Allen Lane, Mt. Airy, Pa.

ELMER GRANT GODSHALK, A.C., Supt., Columbia Lead Co., Esther, Mo.

WALLACE RUSSELL GOSS, C.E., with American Water Works & Guarantee Co., Pittsburg, Pa.

FREDERICK TAYLOR HAINES, C.E., Attorney-at-Law, with J. T. Jackson & Co., Real Estate Brokers, s.e. cor. 13th & Chestnut Sts., Philadelphia, Pa.

THOMAS GRAHAM HAMILTON, E.E., 5912 Margaretta St., Pittsburg, Pa.

ROBERT RIEMAN HARVEY, E.E., 808 Second National Bank Bldg., Wilkes-Barre, Pa.

THOMAS LLOYD HENRY, C.E., Mining Eng'r, Fairbanks, Alaska.

*HOWARD SAMUEL HESS, B.A.

IRA MILLER HIGBEE, C.E., Civil & Hydraulic Eng'r, 9 Market St., Lewisburg, Pa.

WILLIAM JACOB HISS, JR., E.E., Eng'r, New York Telephone Co., 15 Dey St., New York, N.Y. Res: 357 W. 115th St.

WILLIAM HOPKINS, E.E., Capt., U. S. Marine Corps, care Headquarters, U. S. Marine Corps, Washington, D.C. Res: 1324 18th St.

*DREW WILLIAM IRVINE, E.E.

CHARLES BORROWS JACOBS, A.C., Consulting Chemist, 52 Beaver St., New York, N.Y. Res: 403 West Chester Ave., Port Chester, N.Y.

ELMER AUGUSTUS JACOBY, B.A., M.A. ('00), Instructor in Mathematics & Vice-Principal, Perkiomen Seminary, Pennsburg, Pa.

WILLIAM AGASSIZ JAMES, B.S. (in Mining), Chief Draftsman, Lackawanna Steel Co., Buffalo, N.Y. Res: 54 Mariner St.

HENRY SCUDDER JAUDON, C.E., Consulting Municipal, Sanitary and Hydraulic Eng'r, 207 E. Gwinnett St., Savannah, Ga.

ALBERT BEARDSLEY JESSUP, B.S., E.M. ('96), Mining Eng'r, Lehigh Valley Coal Co., Coal Exchange Bldg., Wilkes-Barre, Pa. Res: 54 Butler St., Dorranceton, Pa.

ELISHA BARTON JOHN, C.E., Supervisor, Pennsylvania R.R., Altoona, Pa.

ADOLPH SOMERS KAPELLA, E.E., Railway Engineering Dept., General Electric Co., Schenectady, N.Y. Res: 132 Park Ave.

DIXON KAUTZ, B.S. (Lat Sci.), with F. T. Crowe & Co., Building Materials, Tacoma, Wash.

WARREN BYRON KEIM, C.E., Asst. Eng'r of Erection, Bridge & Construction Dept., Pennsylvania Steel Co., Steelton, Pa. Res: 129 N. 4th St., Harrisburg, Pa.

HENRY EDWARD KIP, B.S. (in Architecture), Supt., Electro Metallurgical Co., Ferris, W.Va.

DAVID HENSHEY LACKEY, E.E., Contracting Eng'r & Dealer in Machinery, Kipp-Lackey Co., 306 Woolver Bldg., cor. Fulton & Adams Sts., Peoria, Ill. Res: 316 Elizabeth St.

WILLIAM ALLEN LAMBERT, B.A., Clergyman, 306 Ridge Ave., Allentown, Pa.

LOUIS EDGAR LANNAN, E.E., Asst. Eng'r, Erie R.R., Box 176, Corry, Pa.

ARTHUR HUGHES LEWIS, B.S., E.M. ('96), Dist. Supt., Lehigh Valley Coal Co., Hazleton, Pa. Res: 542 N. Laurel St.

GERALD LEWIS, A.C., Milford, Pa.

BENJAMIN W. LOEB, A.C., Supt., Reforma M. & M. Co., Campo Morado, Teloloapan Gro, Mexico.

THEODORE PHILIP LOVERING, E.E., Plant Dept., New York Telephone Co., 18 Cortlandt St., New York, N.Y. Res: 37 Morse Ave., Rutherford, N.J.

ROBERT A. MCKEE, M.E., Mechanical Eng'r, Steam Turbine Dept., Allis-Chalmers Co., Box 133, Milwaukee, Wis.

FAYETTE AVERY MCKENZIE, B.S. (Sci.), Ph.D. (University of Pennsylvania), Asst. Prof. of Economics & Sociology, Ohio State University, Columbus, O. Res: 83 16th Ave.

*STUART TUTTLE MCKENZIE, C.E.

NORMAN PEACH MASSEY, C.E.

CHARLES FRAZIER MAURICE, C.E., Civil Eng'r, 45 Broadway, New York, N.Y. Res: Bloomfield, N.J.

JOHN SAMUEL MILLER, M.E., Estimator on Special Work, Bucyrus Co., South Milwaukee, Wis.

ARCHIBALD D. MORRIS, M.E., with International Contracting Co., 17 Battery Pl., New York, N.Y. Res: 3607 Broadway.

WILLIAM SPENCER MURRAY, E.E., Chief Electrical Eng'r, New York, New Haven & Hartford R.R., New Haven, Conn. Res: 57 Trumbull St.

*ROBERT NEILSON, C.E.

JAMES HARRY PHILIPS, C.E., with Delaware, Lackawanna & Western R.R., Hoboken, N.J. Res: 61 9th Ave., Newark, N.J.

*JOSEPH PHILLIPS, JR., B.S., E.M. ('96).

JOHN LIVINGSTON POULTNEY, M.E., Contracting Eng'r, 112 N. Broad St., Philadelphia, Pa. Res: Haverford, Pa.

HENRY CRIDER QUIGLEY, E.E., Foreman, Enameled Wire Dept., Western Electric Co., Chicago, Ill. Res: 30 Beach Ave.

WILLIAM REINECKE, JR., B.S. (in Architecture), European Representative, Robins Conveying Belt Co., of New York, 27 Rue Villejust, Paris, France.

EUGENE JESSE RIGHTS, C.E., with Pittsburg Testing Laboratory, 325 Water St., Pittsburg, Pa.

HERBERT TIMOTHY RIGHTS, C.E., with Lewis F. Shoemaker & Co., Schuylkill Bridge Works, Harrison Bldg., Philadelphia, Pa. Res: Roselawn Cottage, Lansdowne, Pa.

SAMUEL NEELY RITER, M.E., Engineering Dept., Riter-Conley Mfg. Co., 56 Water St., Pittsburg, Pa. Address: Allegheny Country Club, Sewickley, Pa.

*EUGENE SCHWINGHAMMER, E.E.

HARRY KENT SELTZER, C.E., Eng'r of Construction, Union Bridge & Construction Co., 606 Newhelson Bldg., Kansas City, Mo.

JOHN EGBERT SHERO, A.C., Chemist, with Aluminum Co. of America, Niagara Falls, N.Y. Res: 554 5th St.

ROBERT S. SIEGEL, B.A., Attorney-at-Law, Bethlehem, Pa.

EDWIN HARRISON SIGISON, E.E., Inspector of Electrical & Sprinkled Risks, Buffalo Ass'n of Fire Underwriters, 94 Dun Bldg., Buffalo, N.Y. Res: 57 Norwood Ave.

JOHN BLAKE SLACK, E.E., Counselor-at-Law, 444-446 Bartlett Bldg., Atlantic City, N.J.

EDWIN GEORGE STEINMETZ, E.E., Factory Mgr., Electric Vehicle Co., Hartford, Conn. Res: 41 Magnolia St.

JOHN EUGENE STOCKER, B.S. (Sci.), Instructor in Mathematics, Lehigh University, South Bethlehem, Pa. Res: 321 N. Centre St., Bethlehem, Pa.

ROBERT MELVIN TARLETON, A.B. (Johns Hopkins Univ., '88), B.S. (in Metallurgy).

ROBERT SAYRE TAYLOR, B.S. (Sci), Lawyer, First National Bank Bldg., Bethlehem, Pa. Res: 204 S. High St.

NATHANIEL THURLOW, A.C., Research Chemist, 78 Warburton Ave., Yonkers, N.Y.

CHARLES FREDERICK TOWNSEND, B.S. (in Architecture), of Foote & Townsend, Architects, 215 Malley Bldg., New Haven, Conn.

JOSEPH BOYER TOWNSEND, E.E., Supt., Houston Office, Stone & Webster Engineering Corporation, Houston, Texas.

JOHN FREDERICK VAN BENTHEM VAN DEN BERGH, C.E.

WILLIAM RANDOLPH VAN LIEW, B.S. (in Metallurgy), care F. A. Mattevich & Co., Bastoum, South Russia.

*Charles Henry Vansant, C.E.

William Warr, E.E., Vice-Pres., Blaisdell Co., 334 Pacific Electric Bldg., Los Angeles, Cal. Res: 672 Carondelet St.

Fred Irving Wheeler, C.E., Resident Eng'r in charge of Construction of Government Pier, Jamestown Exposition, Norfolk, Va.; and of Fortification Construction, Fort Washington, Md.

Harry Amasa White, E.E., of White & Bro., Smelters & Copper Refiners, 1505 E. Montgomery Ave., Philadelphia, Pa. Res: 1654 E. Berks St.

John Crum Whitmoyer, E.E., Asst. to Sales Mgr., British Westinghouse Electric & Mfg. Co., Trafford Park, Manchester, England.

Edward Newton Wigfall, A.C., Supt. for John T. Lewis & Bros. Co., Philadelphia, Pa. Res: Cynwyd, Pa.

John Marion Wilson, C.E., Engineering Dept., Chicago & Northwestern Ry. Address: Hillsboro, Md.

Harold Lawden Wood, A.C., Chemist, St. Lawrence Sugar Refining Co., Box 34, Maisonneuve, Quebec, Canada. Res: 231 Joliette St., Montreal, Quebec, Canada.

Carlos Yglesias, B.S., E.M. ('96).

CLASS OF 1896.

William James Adams, jr., E.E.

William Stewart Ayars, M.E., Asst. Prof. of Machine Design, Pennsylvania State College, Box 302, State College, Pa.

Hobart Bentley Ayers, M.E., Gen. Mgr., H. K. Porter Co., Pittsburg, Pa. Res: 7211 Meade St.

Albert Doane Ayres, C.E., Pres. & Mgr., Keokuk Electric Ry. & Power Co.; Keokuk Gas Light & Coke Co.; Keokuk & Western Illinois Electric Co., 311 N. 5th St., Keokuk, Ia.

Arthur Davidson Badgley, E.E., with General Electric Co., Schenectady, N.Y. Res: 208 Liberty St.

Francis Hoskins Baldwin, E.E., Office Mgr., Forge Dept., Bethlehem Steel Co., South Bethlehem, Pa. Res: 345 Market St., Bethlehem, Pa.

Hasell Wilson Baldwin, M.E., Vice-Pres., T. H. Symington Co., Corning, N.Y. Res: 16 E. 3rd St.

Louis Warrington Baldwin, C.E., Supt., Indianapolis & Southern R.R., Indianapolis, Ind. Res: 126 E. Pratt St.

Springfield Baldwin, C.E., Resident Eng'r, in charge of Sheridan Div., Chicago, Burlington & Quincy R.R., Sheridan, Wyo.

GEORGE POMEROY BARTHOLOMEW, B.S. (in Metallurgy), Mining Eng'r, E. I. duPont de Nemours Powder Co., Wilmington, Del. Res: 905 Delaware Ave.

FREDERICK RAWDON BARTLES, C.E., with Northern Pacific Railway, Fargo, N.D.

CHARLES C. W. BAUDER, E.E., Mgr., Traffic Dept., Borough of Bronx, New York Telephone Co., 366 E. 150th St., New York, N.Y. Res: 49 Claremont Ave.

FAIRFAX BAYARD, C.E., Examiner of Interferences, 261 U. S. Patent Office, Washington, D.C. Res: 1325 Irving St., N.W.

HERBERT HUEBENER BECK, A.C., Associate Prof. of Chemistry, Franklin & Marshall College, Lancaster, Pa.

EDGAR TWEEDY BELDEN, C.E., Cement, 385 Winthrop Ave., New Haven, Conn.

MORIZ BERNSTEIN, C.E., Eng'r for Reilly & Riddle, Contractors, Walnut Lane Bridge, Roxborough, Philadelphia, Pa. Res: 4344 Germantown Ave.

WARREN JOSHUA BIEBER, B.A., 25 N. Linden St., Bethlehem, Pa.

DANIEL WILLIAM BLIEM, C.E., Mgr., Berlin Plant, American Bridge Co., East Berlin, Conn.

BENJAMIN FRANKLIN BOSSERT, C.E., with Phoenix Bridge Co., Phoenixville, Pa. Res: 310 Hall St.

HOWARD FRANKLIN BOYER, B.S. (Sci.), Topographical Draftsman, Topographical Bureau of Borough of Queens, Long Island City, N.Y. Res: 2230 Beverley Road, Brooklyn, N.Y.

EDWARD ELISHA BRATTON C.E., M.D., First Asst. Eng'r, Bureau of Filtration, Philadelphia, Pa. Res: 5034 Cedar Ave.

FRANK SHEPARD BROMER, M.E., Pastor of First Reformed Church, Cedar Rapids, Ia. Res: 632 L St., W.

MAXIMILIAN JOSEPH BUCHER, A.C., Columbia, Pa.

GEORGE AMANDUS BUVINGER, M.E., Chief Eng'r, High Head Turbines & Turbine Pumps, Platt Iron Works, Dayton, O. Res: 29 Marshall St.

AARON BEAUMONT CARPENTER, E.E., Prof. of Civil & Electrical Engineering, Villanova College, Villanova, Pa.

MALCOLM CARRINGTON, E.E., Sales Eng'r, Westinghouse Electric & Mfg. Co., 1220 New York Life Bldg., Chicago, Ill.

FRANK LESLIE COOKE, E.E., Lawyer, 176 Broadway, New York, N.Y.

ECKLEY SAMUEL CUNNINGHAM, M.E., Mgr. of Mines, Wonder, Nev.

SAMUEL PHILIP CURTIS, M.E., Gen. Mgr., American Gas Co., 222 S. 3rd St., Philadelphia, Pa. Res: Ardmore, Pa.

Frederick Allyn Daboll, C.E., Mgr., Charles Warner Co., 810 Land Title Bldg., Philadelphia, Pa. Res: 805 Highland Ave.

John William Dalman, M.E., with Latrobe Steel & Coupler Co., 1720 Old Colony Bldg., Chicago, Ill. Res: 1632 Graceland Ave.

Samuel Moses Dessauer, B.S. (in Architecture), Eng'r for Wilson & Baillee Mfg. Co., 26 Court St., Brooklyn, N.Y. Res: 128 W. 87th St., New York, N.Y.

William Carter Dickerman, M.E., Vice-Pres., American Car & Foundry Co., 25 Broad St., New York, N.Y. Res: 809 Madison Ave.

Frank Oliver Dufour, C.E., Teacher, 113 Davidson St., Champaign, Ill.

Edward Miall Durham, jr., C.E., Resident Eng'r, Southern Ry., Birmingham, Ala.

Edward Hiram Dutcher, jr., M.E., Supt. & Erecting Eng'r of Cement Plants. Res: 413 Linden St., Bethlehem, Pa.

Timothy Sharpe Eden, E.E., Engineering Dept., General Electric Co., Schenectady, N.Y. Res: 114 Elmer Ave.

George Ramsey Enscoe, C.E., New York Contracting Eng'r for McClintic-Marshall Construction Co., 21 Park Row, New York, N.Y. Res: 315 W. 94th St.

William Alvin Evans, B.S. (in Metallurgy), Asst. Gen. Supt., Consolidated Indiana Coal Co., Hymera, Ind.

Charles Victor Ferriday, M.E., Black Powder Operating Dept., E. I. duPont de Nemours Co., Wilmington, Del. Res: 1210 Delaware Ave.

Curtis Bertram Flory, E.E., Pumping Engine & Hydraulic Turbine Depts., Allis-Chalmers Co., Milwaukee, Wis. Res: 279 25th St.

Clarence Richard Fountain, E.E., Drafting Dept., Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: 1909 Monroe St., Swissvale, Pa.

Thomas Joseph Gannon, M.E., in charge of Mechanical Div. of Dept. of Water Supply, Gas & Electricity, City of New York, 13-21 Park Row, New York, N.Y. Res: 11 Cambridge Pl., Brooklyn, N.Y.

James Brown Given, E.E., Holton, Kans.

*John Savage Graff, E.E.

*William Heald Groverman, M.E.

David Hall, E.E., Asst. Chief Eng'r, Bullock Electric Mfg. Co., Cincinnati, O. Res: 4816 Ash St., Sta. H.

HENRY NEFF HERR, C.E., Civil Eng'r, 108 E. King St., Lancaster, Pa. Res: 613 W. Chestnut St.

HOWARD DRYSDALE HESS, M.E., Asst. Prof. of Machine Design, Cornell University, Ithaca, N.Y. Res: 7 South Ave.

ROBERT PARSONS HOWELL, C.E., Consulting Eng'r & Town Eng'r, Phillipsburg, N.J. Res: 41 Brainerd St.

WILLIAM STEELL JACKSON, E.E., LL.M. (National University, '01), Patent Lawyer, 1232 Chestnut St., Philadelphia, Pa. Res: Bala, Pa.

VICTOR ALBERT JOHNSON, B.S. (in Metallurgy), Vice-Pres., Acme Grain Co., Chamber of Commerce, Minneapolis, Minn. Res: 1678 Hennepin Ave.

VICTOR WITMER KLINE, C.E., Supt. of Construction, Dravo Contracting Co., 812 Lewis Blk., Pittsburg, Pa. Res: 112 Hallett Pl., Bellevue, Pa.

ROBERT EDWIN KRESGE, A.C., Chief Chemist, Bethlehem Steel Co., South Bethlehem, Pa. Res: 308 Brodhead Ave.

ROBERT EDWARD LARAMY, B.A., M.A. ('99), Supt. of Schools, Phoenixville, Pa. Res: 511 S. Gay St.

BRUCE EMERSON LOOMIS, E.E., Mgr., Fire Underwriters Electrical Bureau, 19 Liberty St., New York, N.Y. Res: 12 Carnegie Ave., East Orange, N.J.

CALEB WHEELER LORD, M.E., Manufacturer of Refined Bar Iron & Wrought Washers, Nicetown Plate Washer Co., Philadelphia, Pa. Res: 338 Manheim St., Germantown, Pa.

JOHN BUCKLEY MCBRIDE, C.E., with C. C. Vermuele, Civil Eng'r, 203 Broadway, New York, N.Y. Res: 213 E. Hanover St., Trenton, N.J.

CLIFFORD SHERRON MACCALLA, E.E., Asst. to Gen. Mgr., Washington Water Power Co., Box 17, Spokane, Wash. Res: 2210 Pacific Ave.

VICTOR EMANUEL MASSON, A.C., Supt. & Chemist, Pleasant Valley Wine Co., Rheims, N.Y. Res: Hammondsport, N.Y.

EDWARD WILLIAMSON MILLER, B.S., E.M. ('97), Supt. of Construction, California Portland Cement Co., Colton, Cal. Res: 814 8th St.

RAFAEL DE LA MORA, M.E., Mechanical & Hydraulic Eng'r, Contractor & Importer of Machinery, City Eng'r, Box 269, Calle de San Francisco 19, Guadalajara, Jalisco, Mexico.

CHARLES HOWARD MORGAN, E.E., LL.M., Insurance & Real Estate Agt., 1301 11th Ave., Altoona, Pa. Res: 1217 14th Ave.

William Hitz Mussey, E.E., Chief Draftsman, Long Island R.R. Co., Richmond Hill, N.Y. Res: 568 St. Mark's Ave., Brooklyn, N.Y.

John Henry Myers, C.E., B. & C. Dept., Pennsylvania Steel Co., Steelton, Pa.

Franklin Oberly, E.E., R. F. D., Easton, Pa.

Walter Raleigh Okeson, C.E., Asst. Eng'r, Phoenix Bridge Co., Phoenixville, Pa. Res: 215 Main St.

Louis Atwell Olney, A.C., Prof. of Chemistry & Dyeing, Lowell Textile School, Lowell, Mass. Res: 118 Riverside St.

Horace Lucius Palmer, C.E., Civil & Mining Eng'r, with Oliver Mining Co., 608 Wolvin Bldg., Duluth, Minn. Res: 1502 E. 3rd St.

Jacob Grafius Petrikin, B.S. (in Architecture), with Prairie Gas & Oil Co., Lock Haven, Pa. Res: 217 E. Water St.

Morris Wright Pool, M.E., 82 E. 18th St., Brooklyn, N.Y.

*James Lee Rankin, jr., M.E.

*Henry Paul Reed, E.E.

Homer Austin Reid, C.E., Asst. Eng'r, Bureau of Buildings of Borough of Manhattan, 220 4th Ave., New York, N.Y. Res: Dobbs Ferry, N.Y.

George Homer Ruggles, C.E., Asst. Eng'r, Municipal Engineering Dept., Panama Canal, Empire, Canal Zone, Panama.

Clement Clarence Rutter, C.E., Asst. to Supt., Roadway Shops, Philadelphia Rapid Transit Co., 812 S. Schuylkill Ave., Philadelphia, Pa. Res: 5027 Race St.

John Cornelius Sesser, C.E., Eng'r of Construction, Chicago, Burlington & Quincy Ry., Centralia, Ill.

*Arthur Yeager Shepherd, M.E.

Luther D. Showalter, C.E., 180 N. Charlotte St., Pottstown, Pa.

Henry Shriver, M.E., Mining Supt., Union & New York Mining Co., Mt. Savage, Md.

Edwad Stewart Taylor, M.E., Sec. & Treas., Roteng Engineering Co., 20 Vesey St., New York, N.Y.

William Bailey Taylor, E.E., Engineering Dept., Lynn Works, General Electric Co., Lynn, Mass. Res: 44 Hanover St.

John Augustus Thomson, B.S., E.M. ('97).

Edward Coppée Thurston, B.S. (in Metallurgy), Mining Eng'r, Empire Zinc Co., 703 Symes Bldg., Denver, Col. Res: 1122 Emerson St.

Joseph Wharton Thurston, B.A., with Colorado Fuel & Iron Co., Denver, Col.

CURTIS EDWARD TRAFTON, E.E., with Geo. H. McFadden & Bros. Agency, Fall River, Mass. Res: 40 June St.

HARRY CONKLIN TRIPP, M.E., Salesman, Westinghouse Machine Co., 1119 Chemical Bldg., St. Louis, Mo. Res: Missouri Athletic Club.

JOHN SCOFIELD WALLACE, B.S. (in Metallurgy), with South Sharon Works, Carnegie Steel Co., New Castle, Pa. Res: 68 N. Jefferson St.

ULYSSES GRANT S. WALTERS, C.E., Pottstown, Pa.

HARRY DALLAM WEBSTER, M.E., Designer, American Car & Foundry Co., New York, N.Y. Res: 678 Ave. C, Bayonne, N.J.

*FRANK THOMAS WEILER, C.E.

DAVIS SANNO WILLIAMS, B.S. (in Architecture).

*DAVID WILLIAM WILSON, JR., B.S. (in Architecture).

J. ROBERTS WILSON, E.E., Mgr., Cleveland Office, Crocker-Wheeler Co. of Ampere, N.J., 912 New England Bldg., Cleveland, O. Res: 2072 S. 46th St., S.E.

ALFRED MAHLON WORSTALL, E.E., Contracting Eng'r, Witherspoon Bldg., Philadelphia, Pa.

CLASS OF 1897.

FRANCIS DUPONT AMMEN, M.E., Patent Attorney, 361 Broadway, New York, N.Y. Res: 46 E. 25th St.

HENRY JONATHAN BIDDLE BAIRD, B.S. (in Metallurgy), Virginia Ave., West Chester, Pa.

LATHROP HUTCHINGS BALDWIN, M.E., Treas., Proctor Trust Co., Proctor, Vt.

CHARLES MARSHALL BARTON, C.E., Mgr., Technical Div., E. I. duPont Co., Wilmington, Del. Res: 1210 Delaware Ave.

HARRY LAYFIELD BELL, E.E., with Standard Underground Cable Co., Pittsburg, Pa.

WILLIAM RAGAN BINKLEY, E.E., Supt., Automatic Telephone Co., 41 William St., New Bedford, Mass.; Mgr., Automatic Telephone Co., Fall River, Mass. Res: 163 Arnold St., New Bedford, Mass.

BERTINE FREDERIC BORHEK, A.C., Stock Broker, 14 Athelwold St., Dorchester, Mass.

CHARLES SCHWARTZE BOWERS, E.E., Proprietor, Keystone Silk Weaving Co., Philadelphia, Pa. Res: 26 Park Ave., Elkins Park, Pa.

JOHN BOYT, B.S., E.M. ('98), Secane, Pa.

WILLIAM BURKE BRADY, M.E., Asst. Supt., National Carbon Co., Cleveland, O.

WALTER EVERETTE BROWN, E.E., Div. Equipment Eng'r, New York & New Jersey Telephone Co., 547 Clinton Ave., Brooklyn, N.Y. Res: 726 Lincoln Pl.

SINCLAIR WIGGINS CHILES, C.E., with John Monks & Sons, Contracting Eng'rs of New York, Market Street Bridge, Philadelphia, Pa. Res: 322 N. 6th St., Camden, N. J.

THOMAS HOLLAND CLAGETT, B.S. (in Metallurgy), Asst. Eng'r, Pocahontas Coal & Coke Co., Bramwell, W.Va.

BARTON OLMSTED CURTIS, C.E., Asst. Eng'r, Oregon Short Line R.R., 608 Deseret News Bldg., Salt Lake City, Utah.

PATRICK EDWARD DINAN, A.C., Chemical Eng'r, Portland Cement Chemist, 311 Hinckley Blk., Box 323, Seattle, Wash.

LOUIS DIVEN, E.E., with Dodge Mfg. Co., 143 Cedar St., New York, N.Y. Res: Metuchen, N.J.

BENJAMIN IRVIN DRAKE, B.S. (in Metallurgy), Successor to Drake & Thorp, 42 Broadway, New York, N.Y. Res: 821 Second Pl., Plainfield, N.J.

CLIFFORD GEORGE DUNNELLS, C.E., Designing Eng'r, American Bridge Co., 1456 Frick Bldg. Annex, Pittsburg, Pa. Res: 318 Wabash Ave.

STUART RHETT ELLIOTT, B.S. (in Metallurgy), E.M. ('02), Supt., Negaunee Dist., Cleveland-Cliffs Iron Co., Negaunee, Mich.

ALBERT ANDREW FINKH, M.E., with Automatic Water Purifying Co., New York, N.Y. Res: 214 Woodworth Ave., Yonkers, N.Y.

IRA D. FULLER, E.E., Plant Dept., New York Telephone Co., New York, N.Y. Res: Princeton, N.J.

FRANCISCO MARTINEZ GALLARDO, M.E., C.E. ('98), Constructing Eng'r, 2 a Humboldt 204, Mexico City, Mexico.

ORRIN SATTERLEE GOOD, E.E., Wholesale Lumber, 39 Exchange Bank Bldg., Spokane, Wash. Res: 5th & Mill Sts.

RALPH SCOFIELD GRISWOLD, E.E., Asst. Electrical Eng'r, Pittsburg & Lake Erie R.R., Pittsburg, Pa. Res: Patterson Heights, Beaver Falls, Pa.

WILLIAM THOMAS HANLY, C.E., Supervisor, Pennsylvania R.R., Dravosburg, Pa.

WILLIAM STEPHEN HIESTER, E.E., Electrical Eng'r, Central Iron & Steel Co., Harrisburg, Pa. Res: 813 N. 2nd St.

ROSS NATHANIEL HOOD, E.E., with Ginn & Co., Publishers, 726 Perry Bldg., 16th & Chestnut Sts., Philadelphia, Pa.

HENRY TAYLOR IRWIN, M.E., Treas., Rosedale Foundry & Machine Co., Allegheny, Pa. Res: Edgeworth, Sewickley, Pa.

ARTHUR PERKINS JENKS, E.E., Railway Dept., General Electric Co., Monadnock Blk., Chicago, Ill. Res: 2175 Clarendon Ave.

HARRY SACKETT JOHNSON, E.E., with Iroquois Iron Works, Buffalo, N.Y. Res: East Aurora, N.Y.

HENRY HARRISON JONES, C.E., Gen. Supt., Springfield Consolidated Ry. Co., Springfield Light, Heat & Power Co., Springfield Gas Light Co., Springfield, Ill. Res: 1414 S. 5th St.

LAWRENCE RUST LEE, M.E., Gen Mgr. & Treas., Martinsburg Gas Co., Martinsburg, W.Va.; and Charlestown Gas & Water Co., Shepherdstown, W.Va.

TELFORD LEWIS, B.S. (in Metallurgy), Gen. Supt., Somerset Mining Co. & Knickerbocker Smokeless Coal Co., Hooversville, Pa.

CHARLES VICTOR LIVINGSTON, E.E., Kingston, N.Y.

ARTHUR FROST LOOMIS, E.E., Mgr., Traffic Dept., New York Telephone Co., 123 E. 124th St., New York, N.Y. Res: 3120 Broadway.

BARRY MACNUTT, E.E., M.S. ('98), Asst. Prof. of Physics, Lehigh University, South Bethlehem, Pa. Res: 841 Seneca St.

JAMES GORDON MASON, B.S. (in Metallurgy), Mining Eng'r, Robinson Deep Gold Mining Co., P. O. Box 1488, Johannesburg, Transvaal, South Africa.

WILLIAM ADAMS MEGRAW, M.E., Asst. Eng'r, Sewerage Commission, American Bldg., Baltimore, Md. Res: 1625 Eutaw Pl.

ESTEBAN A. MERCENARIO, C.E., City Eng'r, Palacio Municipal, City of Mexico, Mex.

THADDEUS MERRIMAN, C.E., Asst. to Chief Eng'r, Board of Water Supply of New York, 299 Broadway, New York, N.Y. Res: Essex Falls, N.J.

FRANK DOUGLASS MOUNT, C.E., with Ashmead & Hackney, Civil Eng'rs & Surveyors, 622 Bartlett Bldg., Atlantic City, N.J. Res: 17 N. Virginia Ave.

CARL PIVANY NACHOD, E.E., Pres., United States Engineering Co., Manufacturers of Nachod Automatic Signal, 929 Chestnut St., Philadelphia, Pa. Res: 149 E. Durham St.

HENRY H. NEWTON, M.E., Eng'r, in charge of F. A. Newton Sugar Estate, Hacienda de Contra y Anexas, Tamazulu, Noveno Canton, Jalisco, Mexico.

ROBERT COLLYER NOERR, C.E., Designing Eng'r, Berlin Construction Co., Kensington, Conn. Res: 120 Huntington St., Hartford, Conn.

*Harry Richards Peck, M.E.

James Harkins Pennington, M.E., with Bettendorf Axle Co., 42 Broadway, New York, N.Y.

Morris Havens Putnam, M.E., Gen. Mgr., Terry Construction Co., 90 West St., New York, N.Y. Res: 605 W. 141st St.

John Peake Reynolds, jr., M.E., Water Supply Dept. of New York City, 1521 Park Row Bldg., New York, N.Y. Res: 1117 E. 7th St., Netherwood, N.J.

Samuel Stewart Riegel, M.E., Draftsman, Mechanical Dept., American Locomotive Co., Schenectady, N.Y. Res: 224 Glenwood Boul.

Eugene Peronnean Roundey, C.E., Asst. Eng'r, Cleveland Electric Ry., 603 Electric Bldg., Cleveland, O. Res: 75 Princeton St.

*Clayton Woodford Royce, M.E.

Augustus Leopold Saltzman, M.E., of Cornwall, Plock & Saltzman, Consulting Eng'rs, Hartford Bldg., Broadway & 17th St.; Consulting Eng'r, American Planograph Co., Mechanical Eng'r & Supt., Alpha Mfg. Co., 31 E. 17th St., New York, N.Y. Res: 16 Wilcox Pl., East Orange, N.J.

Charles Fred. Sanders, C.E., Contracting Eng'r, 548 Court St., Reading, Pa.

Charles Francis Scott, E.E., Railway Engineering Dept., General Electric Co., Schenectady, N.Y. Res: 406 Union St.

Henry Hamilton Seabrook, E.E., Local Mgr., Westinghouse Electric & Mfg. Co., Continental Trust Bldg., Baltimore, Md. Res: Earl Court.

Samuel Palmer Senior, C.E., Eng'r & Supt., Bridgeport Hydraulic Co., 820 Main St., Bridgeport, Conn. Res: 310 Beechwood Ave.

Arthur Harold Serrell, E.E., Patent Attorney, 87 Nassau St., New York, N.Y. Res: 7 Agate Court, Brooklyn, N.Y.

Frank Bradley Sheaffer, C.E., Asst. Eng'r, Buffalo, Rochester & Pittsburg Ry., DuBois, Pa. Res: W. Mahoning St., Punxsutawney, Pa.

John Leefe Sheppard, jr., M.E., Supt. of Construction for American Railways Co. of Philadelphia, at Bridgeton Electric Co., Bridgeton, N.J.

Edward Peter Shuman, C.E., Dist. Eng'r, 2nd Engineering Dist., Vigan, Ilocos Sur., P. I.

Jonathan Edward Slade, C.E., Asst. Eng'r, Chicago & Northwestern R.R., 1203 Farnum St., Omaha, Neb.

FRANCIS BETTS SMITH, M.E., Supt. & Resident Eng'r for Scofield Construction Co. of Philadelphia, Pa., Dry Dock, Mare Island Navy Yard, Vallejo, Cal. Res: 720 Napa St.

HENRY WILSON SPRAGUE, M.E., with Alsen Portland Cement Co., Alsen, N.Y. Res: 157 W. Bridge St., Catskill, N.Y.

MICHAEL THOMAS STACK, C.E., 314 E. Centre St., Shenandoah, Pa.

ALVIN RIEGEL STERNER, E.E., Mgr., Atlanta Office, Northern Electrical Mfg. Co., 716 Empire Bldg., Atlanta, Ga. Res: 250 Spring St.

JOHN STEWART, B.S. (in Mining), Gen. Supt. & Eng'r, Century Coke Co., Brownsville, Pa.

PAUL BENO STRAUB, E.E., Supt. of Construction, Fort Pitt Bridge Works, 510 House Bldg., Pittsburg, Pa. Res: Thornburg, Pa.

*THOMAS CEDWYN THOMAS, B.S., E.M. ('98).

WALLACE TREICHLER, C.E., City Eng'r, 47 M. & L. Bldg., Rock Island, Ill.

WILLIAM EDWARD UNDERWOOD, M.E., Asst. Supt., Edison Portland Cement Co., Stewartsville, N.J. Res: 119 McCarthey St., Easton, Pa.

HARRISON RICORD VANDUYNE, E.E., of Harrison VanDuyne & Son, Civil Eng'rs, 800 Broad St., Newark, N.J. Res: 472 Clifton Ave.

CHARLES PARKER WAGONER, C.E., Engineering Dept., Riter-Conley Mfg. Co., 55 Water St., Pittsburg, Pa. Res: 210 Bellefield Ave.

JOHN EUGENE WEIDEMAN, E.E.

GILBERT CASE WHITE, C.E., Consulting Civil & Hydraulic Eng'r, Durham, N.C.

GEORGE LIVINGSTON YATES, E.E., Div. Supt. of Traffic, New York Telephone Co., 40 S. 5th Ave., Mount Vernon, N.Y. Res: 140 S. 10th Ave.

AMBROSE EVERETT YOHN, M.E., Master Mechanic, Huntingdon & Broad Top Mountain R.R., Saxton, Pa.

FRANK STEINMETZ YOUNG, B.S. (in Metallurgy), Inspecting Eng'r for Combustion Utilities Co., with Henry L. Doherty & Co., 60 Wall St., New York, N.Y. Res: 74 Halsted St., East Orange, N.J.

CLASS OF 1898.

HARRY LEIGH ADAMS, C.E., Newark Mgr., New York & New Jersey Telephone Co., 160 Market St., Newark, N.J.

ALANSON QUIGLEY BAILEY, B.A., B.D. (General Theological Seminary), Priest, 804 Burns Ave., Hartwell, Cincinnati, O.

Junius Ballard, M.E.

Alejandro Barrientos, C.E., 47 Santa Lucia ly, Santiago, Cuba.

Frank Breckenridge Bell, M.E., Asst. Supt., Latrobe Steel & Coupler Co., Melrose Park, Ill. Res: 212 20th Ave., Maywood, Ill.

Henry David Bishop, M.E., Mechanical Eng'r, 20 Wall St., Bethlehem, Pa.

Henry Theodore Borhek, B.S. (in Metallurgy), E.M. ('99), with Dr. C. F. McKenna, Chemical & Physical Laboratories. Res: 508 Goepp St., Bethlehem, Pa.

Daniel John Brougham, A.C., 423 E. 4th St., South Bethlehem, Pa.

Horatio Francis Brown, M.E., with Stearns-Roger Mfg. Co., 1720 California St., Denver, Col. Res: 1068 Pearl St.

Paul Bucher, E.E., Supt., White Plains Dist., Westchester Lighting Co., 35 Railroad Ave., White Plains, N.Y. Res: 29 Court St.

David Hope Childs, B.S. (in Metallurgy), Prof. of Physics & Chemistry, Alfred University, Alfred, N.Y.

Herbert Myron Daggett, E.E., with Welsbach Light Co., 24 Summer St., Boston, Mass. Res: Auburndale, Mass.

George Davies, M.E., Sec. & Treas., Davies & Thomas Co., Catasauqua, Pa. Res: 502 Pine St.

William Adam Dehm, C.E., Civil Eng'r & Draftsman, National Tube Co., Lorain, O. Res: 254 George St., Elyria, O.

Charles Meirs Denise, B.S. (Rutgers), C.E., Contracting Eng'r, with McClintic-Marshall Construction Co., of Pittsburg, Pa., 1214 First National Bank Bldg., Chicago, Ill.

John Jacob Eckfeldt, M.E., with Latrobe Steel Co., Latrobe, Pa.

Linden Erle Edgar, M.E., Mgr., Anthracite Coal Region, for Link Belt Engineering Co., of Philadelphia, Pa., 53 Butler St., Kingston, Pa.

Edgar Davis Edmondson, E.E., 2722 St. Charles Ave., New Orleans, La.

Edgar Raymond Frisby, C.E., U.S. Coast & Geodetic Survey, Manila, P.I. Permanent address: 1607 31st St., N.W., Washington, D.C.

William Boyer Fuller, M.E., 335 Bridge St., Catasauqua, Pa.

José Maria Garza Galan, B.S. (in Metallurgy), E.M. ('99).

Robert Edward Lee George, E.E., Mgr., Traffic Dept., Chesapeake & Potomac Telephone Co., 5 Light St., Baltimore, Md. Res: 110 W. North Ave.

WILLIAM GRATZ, E.E., Equipment Dept., New York Telephone Co., 95 Broad St., New York, N.Y. Res: 1705 Bathgate Ave.

FRANK HAMMOND GUNSOLUS, C.E., with E. I. duPont de Nemours Powder Co., Wilmington, Del. Res: 1611 Rodney St.

WENTWORTH GREEN HARE, M.E., with Robins Conveying Belt Co., 13 Park Row, New York, N.Y. Res: 67 Meadow Lane, New Rochelle, N.Y.

RAYMOND HAZEL, E.E., 1st Class Asst. Ordnance Draftsman, Navy Yard, Washington, D.C. Res: 1424 K St., S.E.

HENRY BRUNER HERSHEY, E.E., Resident Eng'r for Ford, Bacon & Davis, Edgewater, N.J. Res: 522 W. 145th St., New York, N.Y.

HERBERT HENNINGER HESS, E.E., with General Electric Co., Schenectady, N.Y.

EDWARD DARLING HILLMAN, M.E., Mechanical Eng'r & Mgr., Railroad Dept., U. S. Metal & Mfg. Co., 25 Broad St., New York, N.Y. Res: Grove Ave., Larchmont Manor, N.Y.

HAROLD JOHN HORN, E.E., Asst. Supt. of Wire Mills, J. A. Roebling's Sons Co., Trenton, N.J. Res: 125 E. Hanover St.

LEONARD SHERMAN HORNER, E.E., Representative, Sales Dept., Crocker-Wheeler Co. of Ampere, N.J., 808 First National Bank Bldg., New Haven, Conn. Res: 42 Church St.

FRANK NORMAN KNEAS, C.E., Eng'r & Contractor, 522 Philadelphia Bank Bldg., 421 Chestnut St., Philadelphia, Pa. Res: 364 Moore St., Norristown, Pa.

BASIL GEORGE KODJBANOFF, M.E., Consulting Illuminating Eng'r; Mgr., Benjamin Electric Mfg. Co., Vice-Pres., E. E. Carey Co., 27 Thames St., New York, N.Y. Res: The Markenfield, 111th St. & Riverside Drive.

JACOB B. KRAUSE, B.A., Graduate Student, University of Pennsylvania, Philadelphia, Pa. Res: 3531 Locust St.

THOMAS H. LAWRENCE, E.E., Mgr., Traffic Dept., New York Telephone Co., 63 Irving Pl., New York, N.Y. Res: 345 W. 56th St.

JOHN BROWN LINDSEY, JR., C.E., Supt., West Pascagoula Creosote Works, West Pascagoula, Miss. Res: Gautier, Miss.

CLARENCE ALBERT LOOMIS, C.E., Contracting Eng'r, Riverside Bridge Co., Martin's Ferry, O. Res: 1102 Chapline St., Wheeling, W.Va.

LEE HOLMES MARSHALL, M.E., of Marshall Bros., Manufacturers of Elevators, Machinery, etc., 21st & Mary Sts., S.S., Pittsburg, Pa. Res: 814 St. James St.

*CHARLES FRANCIS MORITZ, E.E.

*José Aristides de Obaldia, C.E.

John O'Reilly, A.C., Merchant, 3rd & New Sts., South Bethlehem, Pa. Res: 421 E. 3rd St.

Howard Charles Paddock, C.E., Designing Eng'r, Turner Construction Co., 11 Broadway, New York, N.Y. Res: 1916 85th St., Bensonhurst, Brooklyn, N.Y.

Frederick Allen Perley, C.E., Asst. Eng., Engineering Dept., Dist. of Columbia, Washington, D.C. Res: 34th St. & Highland Ave., Cleveland Park, D.C.

Carroll Winston Quarrier, M.E.

Victor Clinton Records, C.E., of W. T. Records & Son, Manufacturers of Flour, Buckwheat, Meal, Hominy, Feed, etc., Laurel, Del.

Percy Lawrence Reed, C.E., M.S. ('01), Instructor in Surveying, Carnegie Technical Schools, Pittsburg, Pa. Res: 732 Millvale Ave.

Benjamin DeWitt Riegel, M.E., Treas., Riegel Sack Co., 327 Washington St., Jersey City, N.J.; Treas., Ware Shoals Mfg. Co., Ware Shoals, S.C. Res: 328 W. 83d St., New York, N.Y.

D'Arcy Wentworth Roper, M.E., Sec. & Asst. Treas., Great Lakes Construction Co., 1117 Chamber of Commerce Bldg., Buffalo, N.Y.

Raphael Francisco Sanchez, B.S. (in Metallurgy), E.M. ('99), Traffic Mgr., & Chief Eng'r, Santa Lucia Sugar Estate R.R. Res: Santa Lucia, Gibara, Cuba.

Henry Cord Schwecke, E.E., Transformer Engineering Dept., General Electric Co., Schenectady, N.Y. Res: 227 Glenwood Boul.

Daniel Franklin B. Shepp, C.E., Cashier, 1st Nat'l Bank, Tamauqua, Pa.

B. Roland Smoot, A.C.

Lewis Cheston Starkey, M.E., Prof. of Mechanical Engineering, Drexel Institute, Philadelphia, Pa. Res: 4909 Penn St., Frankford, Pa.

*James Willis Stauffer, C.E.

Martin Shaaff Stockett, B.A., Rector of Church of Our Saviour, Broadway & Viola St., Camden, N.J. Res: 109 Powelton Ave.

E. Harrison Symington, M.E., Mgr., Western Sales., T. H. Symington Co., Railway Exchange, Chicago, Ill. Res: 103 Lincoln Park Boul.

Edward Hileman Waring, M.E., Engineering Dept., Crocker-Wheeler Co., Ampere, N.J. Res: Glen Ridge, N.J.

CHARLES BARTLETT WARREN, M.E., Sec., W. Warren Thread Works, S. Broad St., Westfield, Mass. Res: 83 Broad St.

LEVI WATTS, JR., E.E., Salesman, Westinghouse Electric & Mfg. Co., of Pittsburg, Pa., 716 Board of Trade Bldg., Boston, Mass. Res: 23 Pinckney St.

HENRY STORRS WEBB, B.S. (M. I. T.), M.S., Principal & Text-book Writer, International Correspondence Schools, Scranton, Pa. Res: 1416 Monsey Ave.

CHARLES EDWARD WEBSTER, JR., B.A., M.D. (Columbia Univ., '02), Physician, 749 Madison Ave., New York, N.Y.

THEODORE BENJAMIN WOOD, M.E., Supt., T. B. Wood's Sons Co., Chambersburg, Pa.

LAWRENCE WOODEN, C.E., Office of Engineering Commissioner, Washington, D.C. Res: 1511 13th St., N.W.

WARREN WORTHINGTON, M.E., B.S. (in Metallurgy, '99), Mill Supt., Clairton, Pa. Res: Rushland, Pa.

SAMUEL AUGUSTUS YORKS, JR., E.E., Sec., Charles Este Co., 20th St. & Glenwood Ave., Philadelphia, Pa. Res: Hamilton Court Apartments.

*HARRY BERNARD ZIMMELE, A.C.

HARRY STATTEN ZIMMERMAN, C.E., Eng'r on Construction Work, Memphis R.R. Terminal Co., 1313 Memphis Trust Bldg., Memphis, Tenn. Res: 902 Rayburn Boul.

CLASS OF 1899.

GEORGE FRED ALLEN, C.E., U. S. Asst. Eng'r, River Improvement, Tuscaloosa, Ala.

LEON WHETSTONE BAILEY, E.E., 766 33rd St., Milwaukee, Wis.

RICHARD CHARLES BECERRA, A.C., with Cerro de Pasco Mining Co., Cerra de Pasco, Peru.

MAURICE CLARK BENEDICT, M.E., Instructor in Mechanical Engineering, Pennsylvania State College, Box 322, State College, Pa.

ARTHUR KNODE BIRCH, E.E., with Bullock Electric Mfg. Co., Cincinnati, O. Res: 2012 Wayland Ave., Norwood, Cincinnati, O.

FRANK ELLIOTT BRADENBAUGH, M.E., with R. L. Neal & Co., 1110 Ann St., Parkersburg, W.Va.

JOHN MORGAN BUCKLAND, B.S. (Sci.), Shipper of Crushed Slag for Roofing, Paving and Concrete Construction, Reading, Pa. Res: 109 N. 13th St., Allentown, Pa.

JOSÉ FERNANDO CAPRILES, C.E., B.S. (in Architecture), Contracting Eng'r & Architect, Sur 6 No. 17, Caracas, Venezuela.

CHARLES FORD CARMAN, C.E., with Scofield Co., Contractors, Pennsylvania Bldg., Philadelphia, Pa.

BERNARD TODD CONVERSE, M.E., with Baldwin Locomotive Works, 500 N. Broad St., Philadelphia, Pa. Res: The Maryland, 317 S. Hick St.

JOHN PETER CROLL, C.E., Draftsman & Computer of Special Work, Street Ry. Dept., Pennsylvania Steel Co., Steelton, Pa. Res: 249 Lincoln St.

RUDOLPH DEGENER, M.E., Broker, Member New York Stock Exchange, 20 Broad St., New York, N.Y. Res: 44 W. 74th St.

NATT MORRILL EMERY, B.A. (Dartmouth, '95), M.A., Registrar, Lehigh University, South Bethlehem, Pa. Res: 125 S. High St., Bethlehem, Pa.

ROBERT FARNAM, JR., C.E., Asst. Eng'r of Construction, Pennsylvania R.R., Washington, D.C. Res: 1733 R St., N.W.

JOSÉ GERVASIO GANDIA, C.E.

EUGENE GIFFORD GRACE, E.E., Gen. Supt., Bethlehem Steel Co., South Bethlehem, Pa. Res: 237 E. Broad St., Bethlehem, Pa.

JOHN WESLEY GRACE, JR., E.E., Supt. of Yards, Bethlehem Steel Co., South Bethlehem, Pa. Res: 501 Goepp St., Bethlehem, Pa.

WILLIAM GUMMERE, A.C., Head Chemist, John A. Roebling's Sons Co., Trenton, N.J. Res: 125 E. Hanover St.

*OSCAR COOPER HANNUM, C.E.

GEORGE AUGUSTUS HORNE, A.C., Chemist, with B. T. Babbit, 82 Washington St., New York, N.Y. Res: 27 Clinton Pl., Hackensack, N.J.

ROY RHODES HORNER, B.S. (in Metallurgy), 544 Pike St., Clarksburg, W.Va.

GEORGE REIFSNYDER JACKSON, C.E., Supt., Austin, Stephenson & Princeton Mines, Cleveland Cliffs Iron Co., Princeton, Mich.

ALEXANDER T. JOHNSON, B.S. (in Metallurgy), Gen. Mgr., Spider-Wasp Mining Co., Wonder, Nev.

EDWARD ALLEN KEYS, C.E., Supt. of Construction of U. S. Public Buildings, Linden, Md.

RUSSELL KIMBALL, M.E., Wool Grower, "Kimbalton" ranch, Big Horn Co., Wyoming; Eng'r & Surveyor, Box 51, Red Lodge, Mont.

ARTHUR WARNER KLEIN, M.E., Instructor in Mechanical Engineering, Lehigh University, South Bethlehem, Pa. Res: 158 S. New St., Bethlehem, Pa.

JOHN HENRY KLINCK, M.E. (Cornell, '94), M.S., Commercial Eng'r, Industrial & Power Dept., Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: Amber Club, 123 N. Negley Ave., E.E.

RICHARD SKEBRETT LANDRON, C.E., City Eng'r, Mayaguez, Porto Rico.

FREDERICK JOHN LITTELL, M.E., Machinery Dept., American Can Co., 135 Adams St., Chicago, Ill. Res: 1230 Wesley Ave., Evanston, Ill.

GEORGE KENNEDY MCGUNNEGLE, A.C., Office Mgr., W. & H. Walker, Herr's Island, Pittsburg, Pa.

OWEN GRAY MACKNIGHT, E.E., Division Traffic Mgr., New York Telephone Co., 312 Hugenot St., New Rochelle, N.Y. Res: 222 Union Ave., Mt. Vernon, N.Y.

CHARLES MICHAEL MASSON, M.E., Farmer, Hammondsport, N.Y. Res: 5 Vine St.

WILLIAM LATHROP MEAKER, A.C., Minister, Dover, Mass.

JAMES FLANDERS MIDDLEDITH, M.E., care Wm. M. Imbrie & Co., 45 Broadway, N.Y.

J. FOSTER MORGAN, E.E., with Thomas Engineering Co., Hazleton, Pa. Res: 13 N. Wyoming St.

CHARLES G. NEWTON, C.E., 1st Asst. Eng'r, Guadalajara Sewer & Water Works, 49 Carmen St., Box 246, Guadalajara, Jalisco, Mexico.

*HENRY RALPH PALMER, M.E.

JOHN READ PETTIT, B.S. (in Metallurgy), 1012 Spruce St., Philadelphia, Pa.

LOUIS THOMAS RAINEY, E.E., Mgr., Power & Mining Depts., Cincinnati Office, General Electric Co., Cincinnati, O. Res: Flat 15 Alexandra, Walnut Hill.

PERCY LESLEY REED, C.E., Supervisor, Pennsylvania R.R., Middleton, N.J.

VICTOR HUGO REID, C.E., Supervisor, Pennsylvania R.R., Watsontown, Pa.

*GUSTAVO ROVELO, M.E.

ABRAHAM A. SHIMER, M.E., Mechanical Eng'r, Cornwall Ore Bank, Pennsylvania Steel Co., Cornwall, Pa.

WILLIAM HAROLD SPEIRS, B.S. (in Architecture), C.E. ('00), Asst. Eng'r, Delaware, Lackawanna & Western R.R., Hoboken, N.J. Address: 64 N. 9th St., Newark, N.J.

ABRAM PETERS STECKEL, E.E., Eng'r, Buffalo Smelting Works, Calumet & Hecla Mining Co., Buffalo, N.Y. Address: University Club.

ROBERT MAXIMILIAN STRAUB, C.E., Sec., Westmoreland Steel Co., Pittsburg, Pa. Res: 4921 Forbes St.

WILLIAM FREDERICK ULRICH, A.C., Chemist, Monroe Laboratory, Oliver Iron Mining Co., Chisholm, Minn.

JOHN SAGE VIEHE, E.E., Electrical Eng'r, Federal Construction Co., Rockingham, N.C.

FREDERICK CHARLES WETTLAUFER, A.C., with Hoboken Ribbon Co., 11th & Jefferson Sts., Hoboken, N.J. Res: 935 Summit Ave., Jersey City Heights, N.J.

HARRY ANDERSON WILCOX, C.E., Engineering Dept., Berlin Plant, American Bridge Co., East Berlin, Conn. Res: 10 Camp St., New Britain, Conn.

GEORGE HERBERT WOOD, M.E., Asst. Eng'r, T. B. Wood's Sons Co., Chambersburg, Pa. Res: E. Market St.

CLASS OF 1900.

LOUIS BENJAMIN ABBOTT, C.E., Chief Eng'r, Consolidation Coal Co., Frostburg, Md.

GEORGE WILLIAM BARAGER, M.E., Master Mechanic, Coxe Bros. & Co., Drifton, Pa.

ALBERT WILLIAM BAYARD, M.E., Sec. & Mgr., LaHacienda Co. & American Blacksmith Co., P. O. Drawer 974, Buffalo, N.Y. Res: 268 Ashland Ave.

BERTHOLD GRAEFF BECK, E.E., with New York Telephone Co., New York, N.Y. Res: 306 W. 143d St.

*THOMAS FRANCIS BELL, M.E.

JOHN FRANCIS BENSON, C.E., of Benson & Drummond, Eng'rs & Contractors, Box 184, Norfolk, Va. Res: 314 Middle St., Portsmouth, Va.

RUSSELL JULIAN BORHEK, C.E., Consulting Eng'r, Reinforced Concrete Construction, 502 Arcade Bldg., Seattle, Wash. Res: The Altamont.

JOHN HALL BOWER, B.S. (in Metallurgy), Chemist, with Warwick Iron & Steel Co., Box 283, Reading, Pa. Res: Pottstown, Pa.

HENRY LAWTON BOWERS, B.S. (in Chemistry), Supt., Standard Ideal Co., Port Hope, Ont., Canada.

ANDREW THOMAS BRICE, E.E., Mechanical Eng'r, with Board of Education, New York, N.Y. Res: 165 E. 80th St.

JOHN JAMES BRICE, C.E., with Alfred Noble, Chief Eng'r of East River Section, Pennsylvania, New York & Long Island R.R. Co., 225 W. 33d St., New York, N.Y. Res: 165 E. 80th St.

*JOSEPH WILLIAM BURKE, B.S. (in Metallurgy), E.M. ('01).

DAVID HASTINGS CANFIELD, B.S. (in Architecture), Architect, Argus Bldg., Middletown, N.Y.

MORROW CHAMBERLAIN, B.S. (Metallurgy), Sec. & Treas., Citico Furnace Co.; Treas., Roane Iron Co., Chattanooga, Tenn.

HUGH BANKS CHAPMAN, E.E., with Westinghouse Electric & Mfg. Co., of Pittsburg, Pa., 812 Union Trust Bldg., Detroit, Mich.

GEORGE CURTIS COUTANT, M.E., Dist. Foreman, New York Telephone Co., Room 384, 18 Cortlandt St., New York, N.Y.

HERBERT CHARLES DILLIARD, C.E., Eng'r & Contractor, East Bangor, Pa.

ALAN CRAIG DODSON, B.S., Asst. Treas., Weston Dodson & Co., Miners & Shippers of Coal, Bethlehem, Pa. Res: 215 Market St.

TRUMAN MONROE DODSON, 2D, B.S., Supt., Dodson Coal Co., Morea Colliery, Pa.

WILLIAM T. DRAKE, M.E., Chief Draftsman, Open Hearth Plant, Pennsylvania Steel Co., Steelton, Pa. Res: Old Forge, Pa.

NIMSON ECKERT, B.A., LL.B. (Harvard, '03), Attorney-at-Law, Insurance, 2 B. & B. Bldg., 6th & Hamilton Sts., Allentown, Pa. Res: 33 S. 16th St.

*JOHN WILLIAM FLETCHER, M.E.

RICHARD MCNAMEE FREEMAN, E.E., Asst. Prof. of Electrical Engineering, University of Kansas, Lawrence, Kan. Res: 1132 Tennessee St.

JOHN FULLER, M.E., Sales Mgr., Robins Conveying Belt Co., 2600 Park Row Bldg., New York, N.Y. Res: 329 W. 58th St.

ARTHUR HENDRIX GILL, M.E., 533 Ontario St., South Bethlehem, Pa.

HERBERT TERRY GREENE, B.S. (in Metallurgy).

FREDERICK AUGUSTUS GROFF, E.E., Engineering Dept., New York Central & Hudson River R.R., Room 1243, 335 Madison Ave., New York, N.Y.

CHARLES FREDERICK GROSS, C.E., Eng'r for Wm. Steele & Sons, Builders & Contractors, 1600 Arch St., Philadelphia, Pa. Res: 2512 N. 29th St.

WILLIAM B. GRUBBE, C.E., Asst. Eng'r, Dept. of Engineering Construction, Borough of Richmond, New Brighton, N.Y. Res: Cherry Lane, West New Brighton, N.Y.

ARTHUR BRADLEY HANSCOM, C.E., Eng'r, Box 206, Phillipsdale, R.I. Res: Providence, R.I.

JOHN GEORGE HEINZ, B.S. (in Metallurgy), E.M. ('01), Draftsman, Duquesne Steel Works, Carnegie Steel Co., Duquesne, Pa. Res: 621 Kelly St., Wilkinsburg, Pa.

Albert Darby Hollingsworth, C.E., Asst. Eng'r, with Jacobs & Davies, Consulting Eng'rs, 128 Broadway, New York, N.Y. Res: Scotch Plains, N.J.

Michael James Honan, E.E., with New York Telephone Co., 30 E. 29th St., New York, N.Y. Res: Oxford, N.J.

Edward Melville Huggins, M.E., Chief Draftsman, E. H. Mumford Co., 17th & Callowhill Sts., Philadelphia, Pa. Res: 4520 Osage Ave.

John Edward Leibfried, A.C., Cement Expert, U. S. Reclamation Service, Armour Inst., Chicago, Ill. Res: 1407 Lawrence St.

George Craig Leidy, C.E., Asst. Supt., Semet-Solvay Co., Steelton, Pa. Res: 416 Spruce St.

William Grant Lessig, M.E., 10 N. Main St., Shenandoah, Pa.

Herbert Spencer Lewis, C.E., with Editor of Topographic Maps, U. S. Geological Survey, Washington, D.C. Res: 611½ Park Road, N.W.

Thomas Windle Lukens, B.S. (in Metallurgy), with Evans & Howard Co., 920 Market St., St. Louis, Mo.

Charles Edward Terry Lull, B.S. (in Metallurgy), 1st Lieut., Coast Artillery Corps, U. S. Army, Fort Rosecrans, San Diego, Cal.

William Thomas McCarthy, B.S. (in Architecture), Pres., Borough Improvement Co., 1 Madison Ave., New York, N.Y. Res: 20 St. Charles Pl., Brooklyn, N.Y.

Kenneth Wesley McComas, A.C., with Anaconda Copper Mining Co. Address: 39 Broad St., Bethlehem, Pa.

*William George McVey, C.E.

Carl Edward Maeder, M.E., Supt. of Rolling Mills, Duquesne Works, Carnegie Steel Co., Duquesne, Pa.

Joseph Patrick Martin, C.E., Resident Eng'r, Tidewater Ry. Co., Dolphin, Va. Res: Charlotte Court House, Va.

Manuel de la Mora, C.E., B.S. (in Architecture), Civil Eng'r & Architect, 219 Avenida Corona, Guadalajara, Jalisco, Mexico. Res: Calle de los Placeros 464.

George Rohrer Morrow, B.S. (in Metallurgy), Highspire, Pa.

Louis Ortner, M.E., Supt., Boiler Dept., Bethlehem Steel Co., South Bethlehem, Pa. Res: 625 Pawnee St.

Arthur Rose Parsons, B.S. (in Metallurgy), Supt. of Mills, Tonopah Mining Co., Tonopah, Nev.

Norman Spearman Powell, B.S. (in Metallurgy), Chief Field Eng'r & Supt. of Construction, Sharon Mills and Furnaces, Sharon, Pa. Res: 2 Forker St.

JOSEPH JACOB REAMER, C.E.

JOHN NICHOLAS REESE, C.E., Gen. Supt., Alabama Consolidated Coal & Iron Co., Gadsden, Ala.

JAMES GORDON ROSS, C.E., Junior U. S. Eng'r, Room N, Custom House, New Orleans, La.

CHARLES EDWARD ROWE, M.E., Engineering Dept., Boston & Montana C. C. & S. M. Co., Great Falls, Mont. Address: care Boston & Montana Smelter, Great Falls, Mont.

ARMANDO SANCHEZ, B.S. (in Metallurgy), E.M. ('01), Asst. Eng'r of Public Works, Mayor 43, Camagüey, Cuba.

EDMUND TROWBRIDGE SATCHELL, A.C.

HARRY HARGER SCOVIL, M.E., Sales Agt., Railway Steel Springs Co. of Latrobe, Pa., 1380 Old Colony Bldg., Chicago, Ill. Res: Virginia Hotel.

JOSEPH STAUFFER SHULTZ, C.E., Lieut., U. S. Navy Corps of Civil Eng'rs, Bureau of Yards and Docks, New York Navy Yard, New York, N.Y.

WALTER S. SMITH, C.E., Draftsman, American Bridge Co., Ambridge, Pa. Res: 1014 Ridge Ave., Allegheny, Pa.

CHARLES SYLVANUS SNYDER, M.E., Supt., Germantown Dist., United Gas Improvement Co., Philadelphia, Pa. Res: 6554 Germantown Ave.

ARTURO SOLORZANO, M.E., Mechanical Eng'r, Managua, Nicaragua.

WILLIAM PAUL STARKEY, M.E., Asst. Gen. Supt. & Chief Eng'r, Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa. Res: 1522 State St.

*JOHN ALVIN STRAUSS, E.E.

HENRY ADOLPH TOBELMANN, B.S. (in Metallurgy), Chief Chemist, Calumet & Arizona Mining Co., Bisbee, Ariz.

JOHN RALPH VANDUYNE, C.E., Resident Eng'r, Cedar Grove Reservoir, Water Dept., 128 Halsey St., Newark, N.J. Res: 350 Summer Ave.

WILLIAM PENN WHITE, E.E., Railway Engineering Dept., General Electric Co., Schenectady, N.Y. Res: 12 N. Ferry St.

TOROS ASADUR KURK YASHARIAN, E.E.

EDWARD ABRAHAM YELLIS, B.S., Instructor, Moravian Parochial School, Bethlehem, Pa. Res: 117 S. High St.

EDWARD ROBINS ZALINSKI, B.S. (in Metallurgy), Ph.D. (Univ. of Leipsic, '04), Mining Geologist & Eng'r, Salt Lake City, Utah. Address: University Club.

CLASS OF 1901.

*Samuel Ray Alder, E.M.

Paul Lewis Anderson, E.E., Inspector, Engineering Dept., New York Telephone Co., 18 Cortlandt St., New York, N.Y. Res: 410 William St., East Orange, N.J.

Joaquim Gregoriano de Andrade, M.E., Surveyor of Public Land in the Amazon State, Manáos, Brazil. Res: Rua 10 de Julho, No. 69.

Charles Elmer Barba, M.E., Asst. Chief Draftsman, Mechanical Eng'r's Office, Pennsylvania R.R., Altoona, Pa. Res: The Sunset.

David Maurice Barry, Met.E., with J. M. Towl, of 26 Broadway, New York, N.Y. Address: Room 303, 137 W. North St., Lima, O.

Newton Wayne Buch, A.C., Instructor in Metallurgy and Mineralogy, Lehigh University, South Bethlehem, Pa.

Timothy Burns, M.E., Supt., 22 inch Mill, Duquesne Works, Carnegie Steel Co., Duquesne, Pa.

David Bean Clark, B.A., Pastor of First Reformed Church, South Bethlehem, Pa. Res: 441 Cherokee St.

*John Henry Crane, E.M.

Francis Donaldson, M.E., with Dravo Contracting Co., 814 Lewis Blk., Pittsburg, Pa. Res: Elizabeth, Pa.

Wiliam Albert Ehlers, M.E., with L. B. Stillwell, Consulting Eng'r, 1314 Continental Bldg.; Instructor in Mechanical Drawing, Maryland Institute, Baltimore, Md. Res: 10 Newberg Ave., Catonsville, Md.

Charles Enzian, C.E., Div. Eng'r, Wyoming Div., Lehigh Valley Coal Co., 11 Coal Exchange Bldg., Wilkes-Barre, Pa. Res: 375 S. River St.

Cadwallader Evans, jr., M.E., Mgr. Pittsburg & Surinam Gold Dredging Co., Paramaribo, Dutch Guiana, S.A. Address: 102 S. Negley Ave., Pittsburg, Pa.

John Henry Flory, E.E., Commercial Eng'r, Power & Mining Dept., General Electric Co., Schenectady, N.Y. Res: 102 Park Ave.

Ernesto Franco, C.E., M.S. ('02).

Lewis Alfred Freudenberger, E.E., Asst. Prof. of Mechanical & Electrical Engineering, Delaware College, Newark, Del.

Morris Wilber Garman, Met.E.

Howard Main Gassman, A.B. (Johns Hopkins, '97), E.E., Electrical Eng'r, Crocker-Wheeler Co., Ampere, N.J. Res: 20 N. 15th St., East Orange, N.J.

FRANK BENJAMIN GEARHART, A.C., with New Jersey Zinc Co., Palmerton, Pa.

THOMAS MERCER GIRDLER, M.E., Gen. Supt., Atlanta Steel Co., Atlanta, Ga. Res: 68 W. 10th St.

WILBUR WILSON GRAFF, E.M., Supt., Cliffs Shaft & Moro Mines, Cleveland Cliffs Iron Co., Ishpeming, Mich.

PERCY LAMAR GRUBB, B.A., Teacher, Technical High School, Harrisburg, Pa. Res: 713 Capitol St.

WEBSTER NEUGARD HAAS, C.E., Asst. Eng'r, Philadelphia Rapid Transit Co., 9th and Dauphin Sts., Philadelphia, Pa. Res: 1632 Green St.

SAMUEL THOMAS HARLEMAN, M.E., Supt., Crucible Dept., Bethlehem Steel Co., South Bethlehem, Pa. Res: 207 E. Broad St., Bethlehem, Pa.

ELWOOD SCOTT HARRAR, E.E., Electrical Supt., Pittsburg & Lake Erie Dock Co., Fairpoint Harbor, O. Res: 125 Watson St., Painesville, O.

*FREDERICK APPLE HAUSMAN, C.E.

EDMUND PERCIVAL JUMP, M.E., Foreman of Rail Mill, Maryland Steel Co., Sparrows Point, Md. Res: 511 C St.

LOUIS GUSTAVE KRAUSE, C.E., Asst. Div. Eng'r, Delaware, Lackawanna & Western R.R., 588 S. Clinton St., Syracuse, N.Y.

SAMUEL TOWNSEND LAUBACH, M.E., with Pennsylvania Steel Co., Steelton, Pa. Res: 405 N. 2nd St., Harrisburg, Pa.

ALBERT RAYMOND LAUBENSTEIN, M.E., Supt., Gas Works, Kansas City, Mo.

OWEN FRANCIS LUCKENBACH, M.E., Supt., Gen. Mfg. Dept., Oil Well Supply Co., Oil City, Pa. Res: 1051 W. 1st St.

CHARLES JOSEPH MCGONIGLE, C.E., Asst. to Contracting Agt., Milliken Bros., 509 Eddy St., San Francisco, Cal. Res: 2188 Green St.

CONRADO EUGENIO MARTINEZ, C.E., in charge of Street and Park Dept., Arsenal, Havana, Cuba. Res: 34 Chacon St.

LUTHER DWIGHT MENOUGH, C.E., with J. L. Menough, Contractor & Builder, York, Pa. Res: 450 W. Philadelphia St.

HENRY JARVIS MOORE, E.M., Treas. & Gen. Mgr., Carolina Barytes Co., Stackhouse, N.C.

EDWARD THOMAS MURPHY, M.E., Contracting Eng'r, Buffalo Forge Co., 39 Cortlandt St., New York, N.Y. Res: 83 St. Nicholas Pl.

JOHN JOSEPH NOLAN, M.E., Sec., Dravo Contracting Co., 814 Lewis Blk., Pittsburg, Pa.

EVERETT JOHNSON PECK, M.E., Patent Examiner, U. S. Patent Office, Washington, D.C.

WALTER HENRY RODNEY, C.E., 2nd Lieut., 1st U. S. Cavalry. Address: care War Dept., Washington, D.C.

FERDINAND W. ROEBLING, JR., M.E., with John A. Roebling's Sons Co., Trenton, N.J. Res: 216 W. State St.

JAMES C. RYAN, E.E., Testing Dept., General Electric Co., Schenectady, N.Y. Res: 33 University Pl.

ALFREDO JORGE SANCHEZ, A.C.

ALBERT CLINTON SAVIDGE, E.E., Consulting Eng'r, Sunbury, Pa.

JOHN WALLACE SHAEFFER, M.E., Asst. Supt., Semet-Solvay Co., Byproduct Coke Ovens, University Bldg., Milwaukee, Wis. Res: 217 Mason St.

CHARLES W. STARTSMAN, B.S. (Iowa State College), E.E., with Crocker-Wheeler Co., Box 22, Ampere, N.J.

HERBERT SPENCER STAUFFER, C.E., Bridge Eng'r's Office, Lehigh Valley R.R. Co., South Bethlehem, Pa. Res: 477 Vine St.

JOHN FIFE SYMINGTON, M.E., Mgr. Eastern Sales, T. H. Symington Co., Manufacturers of Railway Supplies, Calvert Bldg., Baltimore, Md.

EDWARD T. THORNTON, E.M., Supt., Minas Dolores y Anexas, Matehuala, S. Luis, Potosi, Mexico.

GRANDISON GRIDLEY UNDERHILL, C.E., Asst. Eng'r, New York State Barge Canal, Albany, N.Y.

JAMES STRAWBRIDGE VANALEN, E.E., Engineering Dept., General Electric Co., West Lynn, Mass. Res: 35 Cedar St.

GEORGE WILLIAM WELSH, E.E., Electrical Dept., New York Central & Hudson River R.R., 1232 Grand Central Station, New York, N.Y. Res: 213 W. 105th St.

EDWIN BENTON WILKINSON, A.C., in charge of Blast Furnaces, New Jersey Zinc Co., Palmerton, Pa.

HENRY DALZELL WILSON, M.E., with Wilson-Snyder Mfg. Co., Pumping Machinery, 2 Ross St., Pittsburg, Pa. Res: Thornburg, Pa.

TE-CHING STRONG YEN, C.E., Resident Eng'r, in charge of Nankow Pass, Imperial Peking-Kalgan Ry., Peking, China. Res: 571 Burkill Road, Shanghai, China.

ARTHUR REUBEN YOUNG, C.E., Eng'r, Fort Pitt Bridge Works, 45 Broadway, New York, N.Y. Res: 216 W. 121st St.

CLASS OF 1902.

FREDERIC ARTHUR ARMSTRONG, E.E., Electrical Contractor, 52 Dey St., New York, N.Y. Res: 249 President St., Brooklyn, N.Y.

ARTHUR GARFIELD BACHMAN, A.C., Asst. Supt., Battery Dept., National Carbon Co., Cleveland, O. Res: 2109 Detroit St.

ROBERT MONTGOMERY BIRD, M.E., Supt., Treatment Depts., Bethlehem Steel Co., South Bethlehem, Pa. Res: 433 Brodhead Ave.

WILLIAM TAGGART CARPENTER, C.E., Sanitary Chemist & Eng'r, 927 Broad St., Newark, N.J.

JOHN ATKINSON CUNNINGHAM, E.E., Asst. Supt., Saginaw-Bay City Ry. & Light Co., Saginaw, Mich. Res: 302 S. Weadock St.

JAMES MITCHELL DANIEL, JR., E.M., Gen. Mgr., Leonora y Huerta Minas, Apartado 16, Aguascalientes, Mexico.

ALPHA ALBERT DIEFENDERFER, A.C., Instructor in Chemistry, Lehigh University, South Bethlehem, Pa. Res: 636 W. Broad St., Bethlehem, Pa.

JAMES NETHERMARK DOWNEY, E.E., Asst. Supt., Camden Coke Co., Front & Chestnut Sts., Camden, N.J. Address: 1509 Arch St., Philadelphia, Pa.

EDWARD ALBERT RANDOLPH EICHNER, C.E., 924 Bloomfield Ave., Hoboken, N.J.

HENRY LEROY FRYER, C.E., Civil Eng'r, State House, Trenton, N.J. Res: 131 Mercer St.

CASTULO GALLARDO, C.E., with Southern Ry., Guadalajara, Jalisco, Mexico. Res: Calle de la Compañia 24.

JOHN THOMAS GAVAN, C.E., with Brown & Edwards, Civil, Mining & Mechanical Eng'rs, Silver City, N.M.

WILLIAM BERGER GEISER, B.S. (in Chemistry), Asst. Chemist, New York Central & Hudson River R.R., Albany, N.Y. Res: 48 Manning Boul.

PETER WILLIAM GLEASON, M.E., Designer, Westinghouse Machine Co., East Pittsburg, Pa. Res: 5744 Parker St., E.E.

FELIX GOLIAN, C.E., Mgr., New Orleans Office, Virginia Bridge & Iron Co., 304 Hibernia Bldg., New Orleans, La. Res: 1621 St. Charles Ave.

CHARLES ALBERT GRADWOHL, A.C., with Keasbey & Mattison Co., Ambler, Pa.

ROBERT FRANKLIN GROSS, Met.E., 211 Garrison St., Bethlehem, Pa.

MAXIMILIAN SHOWZO HACHITA, E.M., Asst. to Mining Eng'r, Lehigh Valley Coal Co., Wilkes-Barre, Pa. Res: 67 Academy St.

WILLIAM RANKIN HALL, C.E., Draftsman, Phoenix Bridge Co., Phoenixville, Pa. Address: Box 683.

WALTER SCOTT HANNA, C.E., Asst. Eng'r, State Dept. of Health, Harrisburg, Pa. Res: Camp Hill, Pa.

JOHN S. HEGEMAN, M.E., Heavy Machinery Salesman, Bethlehem Steel Co., South Bethlehem, Pa. Res: 509 N. Linden St., Bethlehem, Pa.

WILLIAM LOUIS HEIM, A.C., Asst. Supt., Sergeant Glass Co., Kane, Pa. Res: 115 Biddle St.

FOSTER HEWETT, Met.E., Mining Eng'r, Pittsburg Testing Laboratory, 325 Water St., Pittsburg, Pa. Res: 5746 Howe St.

EDWIN HIGGINS, JR., E.M., Gen. Mgr., Columbus-Butte Mining Co., Butte, Mont.

ALBERT CASS HUTCHINSON, C.E., Engineering Dept., Brown-Ketcham Iron Works, Indianapolis, Ind. Res: 1738 Ruckle St.

WILLIAM HENRY JAXHEIMER, M.E., Asst. Supt. No. 4 and No. 5 Machine Shops, Bethlehem Steel Co., South Bethlehem, Pa. Res: 108 N. High St., Bethlehem, Pa.

WALTER SCOTT JOHNS, JR., C.E., Asst. Supervisor, Pennsylvania R.R., Tyrone, Pa.

CHARLES EDGAR KENDIG, E.M., E.E. ('06), Maintenance of Way Dept., Pennsylvania R.R. Res: 208 Ridgewood Road, Roland Park, Md.

WALTER SAVAGE LANDIS, Met.E., M.S. ('06), Asst. Prof. of Mineralogy & Metallurgy, Lehigh University, South Bethlehem, Pa. Res: 211 S. New St., Bethlehem, Pa.

FREDERICK FARRAR LINES, Met.E., Supt., Bessemer Dept., Maryland Steel Co., Sparrows Point, Md.

MYRON JACOB LUCH, B.A., M.A. ('03), Ph.D. (Tulane, '07), Asst. Prof. of English, Lehigh University, South Bethlehem, Pa. Res: 208 1st Ave., Bethlehem, Pa.

JOHNSON MCVEY, A.C., Chemist, Edison Portland Cement Co., New Village, N.J. Res: 352 Firth St., Phillipsburg, N.J.

ELMER MCCLELLAN MILHEIM, E.E., Salesman, Neill-Pinckney-Maxwell Co., Electrical Supplies, 925 Arch St., Philadelphia, Pa. Res: 3638 N. Broad St.

WILLIAM LLOYD MORGAN, C.E., Lessee of Richland Coal Co., Petersburg, Pa.

CHARLES EDWIN PUGH MURRAY, C.E., Draftsman & Computer of Special Work, Frog & Switch Dept., Pennsylvania Steel Co., Steelton, Pa. Res: 1904 Green St., Harrisburg, Pa.

FLOYD WILLIAMS PARSONS, E.M., Associate Editor *Engineering & Mining Journal*, 505 Pearl St., New York, N.Y. Res:. The Portland, 115th St. & Riverside Drive.

WILLIAM FRANK ROBERTS, M.E., Master Mechanic, Bethlehem Steel Co., South Bethlehem, Pa. Res: 411 N. Linden St., Bethlehem, Pa.

DANIEL MARTIN SACHS, JR., M.E., Chief Eng'r, New York Transit Co., 802 Kilmer Bldg., Binghamton, N.Y. Res: The Madison, 27 Warren St.

JOSEPH AIKEN SIMONS, E.E., Black Powder Operating Dept., E. I. duPont de Nemours Powder Co., duPont Bldg., Wilmington, Del.

WILLIAM PENN SLIFER, C.E., Instructor in Civil Engineering, Western University of Pennsylvania, Allegheny, Pa. Res: 221 Euclid Ave.

PAUL HELSEL SMITH, E.E., with Westinghouse Electric & Mfg. Co., Bank of Commerce Bldg., St. Louis, Mo.

EDMUND SEWELL STEVENS, C.E., Asst. Div. Eng'r, Baltimore & Ohio R.R., Connellsville, Pa. Res: Hotel Wyman.

RICHARD FERRIER TAYLOR, E.E., with Bethlehem Steel Co., South Bethlehem, Pa. Res: 244 Market St., Bethlehem, Pa.

WILLIAM ERNEST THOMAS, E.M., Mine Supt., Southern Coal Co., Casselman, Pa.

ROBERT WILLIAM THOROUGHGOOD, C.E., Instructor in Civil Engineering, Cornell University, Ithaca, N.Y. Res: 302 Stewart Ave.

CLASS OF 1903.

RICHARD LATTIMER ADAMS, C.E.

NORMAN ZABRISKIE BALL, C.E., Asst. Eng'r, American Pipe Mfg. Co., 112 N. Broad St., Philadelphia, Pa. Res: Swarthmore, Pa.

GEORGE CARLTON BECK, A.C., Instructor in Chemistry, Lehigh University, South Bethlehem, Pa. Res: 414 Wyandotte St.

SYLVANUS A. BECKER, C.E., Instructor in Civil Engineering, Lehigh University, South Bethlehem, Pa. Res: 103 North St., Bethlehem, Pa.

WILLIAM SMITH BROWNELL, JR., C.E., Engineering Dept., Baltimore & Ohio R.R., Philadelphia, Pa. Res: 3618 Powelton Ave.

GEORGE WISHARD BUTZ, C.E., Civil Eng'r, Borough Eng'r, Schuylkill Haven, Pa.

Thomas Leo Cannon, C.E., Asst. Mgr., Pittsburg Plant, McClintic-Marshall Construction Co., Pittsburg, Pa.

Courtland Fremont Carrier, jr., A.C., with Warner Chemical Co., Carteret, N.J.

George F. Cassedy, M.E., with Consolidated Gas Co. of New York, York, Pa.

César Castellanos, C.E., 11 Ave. Sur, Comitan, Chiapas, Mexico.

Hiram Sanborn Chamberlain, jr., E.M., with Citico Furnace Co., 61 Chamberlain Bldg., Chattanooga, Tenn. Res: 237 E. Terrace St.

John Joseph Cort, E.E., with L. B. Stillwell, Consulting Electrical Eng'r, 100 Broadway, New York, N.Y. Res: 681 E. 29th St., Brooklyn, N.Y.

Chauncy Shackford Curtis, M.E., Engineering Dept., Carnegie Steel Co., Duquesne, Pa.

Paul Arnold Degener, M.E., Contracting Eng'r, with Dempcy-Degener Co., 809 Empire Bldg., Pittsburg, Pa. Res: University Club.

Alfred John Diefenderfer, B.A., with Wyckoff, Church & Partridge, Broadway & 56th St., New York, N.Y. Res: 14 W. 84th St.

Harry Weiser Eisenhart, M.E., Sales Agt., Bethlehem Steel Co., of South Bethlehem, Pa., 100 Broadway, New York, N.Y.

Louis Withers Evans, M.E., Eng'r, Underwriters' Association of the Middle Dept., 316 Walnut St., Philadelphia, Pa. Res: 3260 Chestnut St.

Samuel Palmer Felix, M.E., with Latrobe Steel & Coupler Co., Melrose Park, Ill. Res: 126 17th Ave., Maywood, Ill.

Samuel Randolph Fraim, M.E., Sec., E. T. Fraim Lock Co., Lancaster, Pa. Res: 551 N. Lime St.

Arthur Frick, M.E., with United Gas Improvement Co., 3 S. 37th St., Philadelphia, Pa. Res: 4826 Hazel Ave.

Thomas Kimble Reed Gardner, C.E., Egg Harbor City, N.J.

Paul Gerhard, M.E., Salesman, Westinghouse Electric & Mfg. Co., Union Bank Bldg., Pittsburg, Pa. Res: 3603 5th Ave.

Walter David Gernet, C.E., Superintending Eng'r, Albright & Mebus, Civil Engineers, 908 Land Title Bldg., Philadelphia, Pa. Res: 655 Brooks Ave.

Arthur Simon Gilmore, B.A., Teacher of History in High School, Williamsport, Pa. Res: 1231 Isabella St.

Louis Tracy Girdler, M.E., with Dempcy-Degener Co., 809 Empire Bldg., Pittsburg, Pa.

ALFRED ROBINSON GLANCY, M.E., Master Mechanic, Juragua Iron Co., Santiago, Cuba.

SOLOMON W. GOLDSCHMIDT, E.E., Merchant, Mt. Carmel, Pa. Res: East Ave.

CHESTER BROOKS GRAHAM, E.E., Eng'r, Bridge Dept., New York Telephone Co., 15 Dey St., New York, N.Y. Res: 805 E. 13th St., Brooklyn, N.Y.

HUGH WHITMAN HAYNES, C.E.

NICHOLAS HUNTER HECK, B.A., C.E. ('04), Asst., U. S. Coast & Geodetic Survey, Washington, D.C.

JOHN WALTER HERTZLER, M.E., Traveling. Address: 131 E. Orange St., Lancaster, Pa.

*CHARLES FREDERICK HINKLE, JR., E.E.

RAYMOND HUNT, E.E., Supt., Electric Dept., Tidewater Power Co., Wilmington, N.C. Res: Carolina Apartments.

HARVEY ERNEST JORDAN, B.A., M.A. ('04), Ph.D. (Princeton, '07), Adjunct Prof. of Anatomy, Histology & Embryology, University of Virginia, Charlottesville, Va. Res: University Heights.

WILLIS ROBERT JORDAN, C.E., Borough Eng'r; Treas., Gabriel Hosiery Co., Coopersburg, Pa.

GEORGE MURRAY LEWIS, C.E., Seneca Falls, N.Y.

CANBY GUY LORD, B.A., Director, Y. M. C. A., Kansas City, Mo.

CHARLES EDWIN MARKS, E.E., with United Electric Light & Power Co., 519 W. 146th St., New York, N.Y. Res: 131 Sherman Ave.

EMORY THOMPSON MILLER, E.M., with Dravo Contracting Co., 814 Lewis Blk., Pittsburg, Pa.

ELIAS ROBINS MORGAN, M.E., with Robins New Conveyor Co., Old Colony Bldg., Chicago, Ill. Res: 5616 Washington Ave.

WILLIAM HENRY MYERS, M.E., with Smyser-Royer Co., York, Pa. Res: 440 W. Philadelphia St.

ARCHIBALD ERNEST OLPP, A.C., Student, University of Pennsylvania, Philadelphia, Pa. Res: 3902 Baltimore Ave.

FREDERICK JAY PAYNE, M.E., with Latrobe Steel Co., Latrobe, Pa.

ELMER CLINTON PEARSON, B.A., Siegfried, Pa.

JOHN ROUTT REIGART, E.M., Supt. Crosby Mine, Nashwauk, Minn.

NATHAN BENNETT ROBBINOVITZ, E.E., Electrical Construction, 72 Summer Ave., Brooklyn, N.Y. Res: 699 Flushing Ave.

GEORGE LOOMIS ROBINSON, C.E., Pres., New York Sewage Disposal Co., 1 Madison Ave., New York, N.Y. Res: Graham Court, 116th St. & 7th Ave.

JOHN DWIGHT ROGERS, C.E., Div. Eng'r, Fairmont Coal Co., Fairmont, W.Va.

COLDEN L'HOMMEDIEU RUGGLES, E.E., Major, Ordnance Dept., U. S. Army, Watertown Arsenal, Watertown, Mass.

VICENTE SAUCEDO, C.E., Res. Eng'r, Water Works & Sewers, Box 291, Monterey, N.L., Mexico.

FRANCIS RAUCH SCHMID, C.E., with New Jersey Bridge Co., Manasquan, N.J.

ROYER NEWTON SKILLMAN, E.E., Electrical Contracting, Light & Power Machinery Co., 622 E. 25th St., Indianapolis, Ind.

DAVID ROBERT SMITH, M.E., Manufacturer of Circuit Breakers, Switchboard Equipment Co., Bethlehem, Pa. Res: 437 Goepp St.

DYER SMITH, M.E., Asst. Examiner, Patent Office, Washington, D.C. Res: The Woodley.

THOMAS KILE SMITH, B.A., Teacher, Bethlehem Preparatory School, Bethlehem, Pa.

ARTHUR VALL SPINOSA, C.E., with McClintic-Marshall Construction Co., Pittsburg, Pa. Res: Colonial Apartments, Wilkinsburg, Pa.

GEORGE ROSEBERY STULL, B.A., M.A. ('07), Ridley Park, Pa.

JOHN HECKEWELDER TRAEGER, C.E., with F. M. Dey & Bro., Architects, 925 Chestnut St., Philadelphia, Pa.

HENRY ROSCOE TRUMBOWER, B.A., Fellow in Social Science, Princeton University, Princeton, N.J. Res: Merwick.

WHITMELL PUGH TUNSTALL, C.E., with Capital Traction Co., 36th & M Sts., Washington, D.C. Res: 1706 19th St., N.W.

BOWDEWINE BERTRAND VAN SICKLE, B.A., Private Sec., Keuffel & Esser Co., Hoboken, N.J. Res: 96 Grace St., Jersey City Heights, N.J.

MARCUS ACHESON WALKER, M.E., with Lehigh Valley Coal Co., Wilkes-Barre, Pa.

HENRY RADCLYFFE WALTERS, C.E., Supt. of Manufacture, Guerber Engineering Co., Bethlehem, Pa. Res: 228 Wall St.

NEWTON AMOS WOLCOTT, E.E., Supt., Packard Electric Co., Warren, O. Res: 215 E. Belmont St.

CLASS OF 1904.

GEORGE BAILY, C.E., with Dravo, Doyle & Co., Contracting Eng'rs, 1001 Mercantile Library Bldg., Cincinnati, O. Res: Flat 24, Haddon Hall.

HARVEY PETTIBONE BARNARD, A.C., Asst. Supt. of Open Hearth No. 1, Bethlehem Steel Co., South Bethlehem, Pa.

CHARLES GREENE BAUMGARTNER, M.E., Dept. of Tests, American Bridge Co., Box 384, Ambridge, Pa.

HOWARD GREEN BAYLES, Met.E., with Rendall Ore Reduction, 120 Liberty St., New York, N.Y. Res: 106 W. 57th St.

JACOB LYNFORD BEAVER, E.E., Instructor in Electrical Engineering, University of Pennsylvania, Philadelphia, Pa.

LUTHER BECKER, M.E., with F. W. Horne, Box 174, No. 70 C, Yokohama, Japan. Res: 75 A, Bluff.

LESTER BERNSTEIN, C.E., Field Eng'r, Dept. of Surveys, Baltimore & Ohio R.R., Box 446, Morgantown, W.Va.

ROBERT CONNOR BIRD, E.E., with Fire Underwriters Electrical Bureau, 95 William St., New York, N.Y. Res: 1120 Hancock St., Brooklyn, N.Y.

CLINTON JOEL BLOSS, M.E., with Lehigh Foundry Co., Fullerton, Pa. Res: 35 S. Madison St., Allentown, Pa.

HAROLD GRANT BONNER, M.E., Supt., Windber Electric Co. and Windber Water & Power Co., Windber, Pa. Res: University Club.

ABRAHAM GEORGE BOROWSKY, E.E., Treas. & Mgr., Atco Metal Mfg. Co., Atco, N.J.

GEORGE HIRSH BRANDES, E.E., with Link Belt Engineering Co., Nicetown, Philadelphia, Pa. Res: 1727 N. 33rd St.

JACOB HERBST BRILLHART, C.E., Chief Eng'r, Guerber Engineering Co., Bethlehem, Pa. Res: 516 Pawnee St., South Bethlehem, Pa.

EDWARD CLAUDE BROWN, E.E., Inspector, Electrical Dept., New York Central & Hudson River R.R., care W. G. Carlton, Grand Central Station, New York, N.Y. Res: 142 E. 55th St.

WILLARD LYNN BRUNER, A.C., 2312 N. 7th St., Philadelphia, Pa.

CARLETON WARD BUELL, C.E., Field Eng'r, Construction Dept., Erie R.R. Address: Terryville, Conn.

HENRY FREAS CAMPBELL, C.E., Supt., Union Copper Co., Globe, Ariz. Res: Belleview, Ariz.

SAMUEL LEROY CAUM, M.E., Chief Eng'r, Edison Portland Cement Co., Stewartsville, N.J. Res: 111 W. 4th St., South Bethlehem, Pa.

AMOS HENRY CLAUDER, C.E., Asst., Engineering Corps, New York Div., Baltimore & Ohio R.R., St. George, N.Y.

HORACE BROOKS CLEAVELAND, E.E., Experimental Railway Track, General Electric Co., Schenectady, N.Y. Res: 26 Division St.

Baxter Augustus Cornwell, E.E., Asst. Supt., Greenville Gas, Electric Light & Power Co.; Paris Mountain Water Co.; Greenville Traction Co., Greenville, S.C. Res: 530 North St.

Milton Burnett Cory, E.M., 512 Ford Ave., Minneapolis, Minn.

Luis Cuesta, C.E., Parroquira, No. 15, Guadalajara, Jalisco, Mexico.

Alexander Lardner Dornin, M.E.

William Emminger Dunbar, C.E., Rodman, Pennsylvania R.R. Address: 218 N. 2nd St., Harrisburg, Pa.

Harry Elias Edmonds, C.E., Sec., Intercollegiate Branch, Y.M.C.A. of New York City, 328 W. 56th St., New York, N.Y. Res: 417 W. 114th St.

Andrew Joseph Farabaugh, E.M., 1310 16th St., Altoona, Pa.

Louis Edward Farabaugh, M.E., with Latrobe Steel & Coupler Co., Melrose Park, Ill. Res: 116 16th Ave., Maywood, Ill.

John Warren Fisher, C.E., Asst. Eng'r's Office, Pennsylvania R.R., Williamsport, Pa. Res: 511 Louisa St.

William Warner Fitch, A.C., Head Chemist, Juragua Iron Co., Santiago, Cuba.

Clarence Jonas Frederici, C.E., with Div. Eng'r, Ashland Div., Chicago & Northwestern Ry., South Kaukauna, Wis.

Lyle Ray Garrison, A.C., with Ludlum Steel & Spring Co., Pompton, N.J.

Randolph Edward Spencer Geare, M.E., Eastern Sales Mgr., Dayton Hydraulic Machinery Co., 133 Liberty St., New York, N.Y. Res: 744 Carlton Ave., Plainfield, N.J.

George Kendrick Goodwin, M.E., with Pennsylvania Steel Co., Steelton, Pa. Res: 1232 Mulberry St., Harrisburg, Pa.

John Jacob Grabbe, M.E., Draftsman, Lorain Steel Co., Johnstown, Pa. Res: 984 Fronheiser St.

Oliver Jacob Haller, M.E., Mechanical Eng'r, American Foundry & Construction Co., Pittsburg, Pa. Res: 1515 Asbury Pl.

Herbert Joseph Hartzog, B.A., Attorney-at-Law, Anthracite Bldg., South Bethlehem, Pa. Res: 414 Wyandotte St.

Carl Swing Heritage, C.E., with McClintic-Marshall Construction Co., Pittsburg, Pa. Res: 1001 Franklin Ave., Wilkinsburg, Pa.

Ray Livingston Herrick, E.M., Associate Editor, *Mines & Minerals*, Scranton, Pa. Res: Y.M.C.A. Bldg.

Jesse Bowman Hirst, E.E., Supt., Kenosha Gas & Electric Co., Kenosha, Wis. Res: 210 Wisconsin St.

SAMUEL HENRY HODGES, M.E., Mechanical Eng'r & Asst. to F. W. Horne, Yokahama, Japan.

ROBERT PARKE HUTCHINSON, E.M., 896 8th Ave., Munhall, Pa.

HENRY LANDON JACKSON, C.E., with Bethlehem Steel Co., South Bethlehem, Pa. Res: 443 Seneca St.

RALPH GRANT JOHNSON, C.E., with Dravo Contracting Co., 814 Lewis Blk., Pittsburg, Pa. Res: 1736 Buena Vista St., Allegheny, Pa.

RAMSEY DANIEL KAVANAUGH, M.E., Engineering Dept., Northwestern Telephone Exchange Co., 3rd Ave. S. & 5th St., Minneapolis, Minn. Res: 118 State St., S.E.

MARCUS AUGUSTUS KECK, C.E., with Bell Telephone Co., 13th & Arch Sts., Philadelphia, Pa. Res: 1127 S. 46th St.

BERT MOSS KENT, M.E., with Bethlehem Steel Co., South Bethlehem, Pa. Res: Hotel Majestic.

PAUL THEODORE KRAUSE, A.C., with Vreeland Chemical Co., Box 12, Little Falls, N.J.

WILLIAM ALEXANDER LINN, E.E., with Philadelphia Electric Co., 26th & Callowhill Sts., Philadelphia, Pa. Res: 3323 Spring Garden St.

CHARLES WILLIAM LÜDERS, B.A., Medical Student, University of Pennsylvania, Philadelphia, Pa. Res: 303 Brooks Dormitories.

WILLIAM THURSTON MACCART, C.E., Asst. Supervisor of Tracks, New York Central & Hudson River R.R., Fonda, N.Y.

WARREN COURTLAND MACFARLANE, M.E., with Monongahela Mfg. Co., Monongahela, Pa. Res: 308 4th St.

LOUIS GHEEN MCCAULEY, M.E., Eng'r, Westinghouse Air Brake Co., Pittsburg, Pa. Res: 640 Peebles St., Wilkinsburg, Pa.

JOHN MCCLEARY, JR., C.E., with Fort Pitt Bridge Works, Canonsburg, Pa.

FRANK JAMES MCDEVITT, M.E., Asst. Roller on Billet Mill, Carnegie Steel Co., Youngstown, O. Res: 1011 Mahoning St.

EDGAR MCCROREY MACK, C.E., Asst. Supt., Wilmore Coal Co., Windber, Pa.

JOHN MEREDITH MILLER, C.E., Draftsman, Jones & Laughlin Steel Co., Pittsburg, Pa. Res: Glen Osborne, Pa.

CHARLES LAW MOFFATT, M.E., Turbine Testing Dept., General Electric Co., Schenectady, N.Y. Res: 230 Liberty St.

THOMAS ARCHER MORGAN, B.A., Attorney-at-Law, 504 Commonwealth Bldg., 1701 Church Ave., Scranton, Pa.

Clarence Rupert Morss, B.A., Medical Student, University of Pennsylvania, Philadelphia, Pa. Res: 228 Class of '87 Dormitory.

Leigh Merle Morss, B.A., Law Student, University of Pennsylvania, Philadelphia, Pa. Res: Univ. of Pa. Dormitories.

Howard Mallett Prevost Murphy, M.E., with Westinghouse Air Brake Co., Pittsburg, Pa. Res: 6733 McPherson St.

William Updegraff Mussina, M.E., Merchant & Real Estate, 1 E. 3rd St., Williamsport, Pa. Res: 219 Market St.

Charles Leonard Orth, E.E., with Westinghouse Electric & Mfg. Co., 600 Bank of Commerce Bldg., St. Louis, Mo.

Donald Julian Packer, C.E., with American Bridge Co. Address: 79 N. Clinton Ave., Trenton, N.J.

Charles Roland Peebles, Met.E., with Toledo Furnace Co., Toledo, O. Res: 310 Euclid Ave.

John Franklin Pelly, M.E., Instructor, Drexel Institute, Philadelphia, Pa. Res: 4315 Larchwood Ave.

Horace Weiser Pfahler, A.C., Chemist, New Jersey Zinc Co., Freemansburg, Pa. Res: 907 Delaware Ave., South Bethlehem, Pa.

Harold Shippen Pierce, M.E., with Link Belt Engineering Co., Nicetown, Philadelphia, Pa.

William Calland Pollitt, C.E., with Bridgeport Hydraulic Co., Bridgeport, Conn. Res: 780 William St.

John Howell Powell, M.E., with Railway Steel Spring Co., Latrobe, Pa. Res: 1207 Ligonier St.

Harold Patterson Reno, M.E., with Sayles Bleacheries, Saylesville, R.I.

Stanley Sylvester Seyfert, E.E., Instructor in Electrical Engineering, Lehigh University, South Bethlehem, Pa. Res: 425 Chestnut St.

Stewart Sumner Shive, E.E., Sales Dept., Jeffrey Mfg. Co., 1710 Farmers Bank Bldg., Pittsburg, Pa. Res: 507 Kelley Ave., Wilkinsburg, Pa.

William Roy Shively, M.E., Mgr., Technical Dept., Hapgoods, Commonwealth Bldg., Philadelphia, Pa.

Francis Peirce Sinn, E.M., with New Jersey Zinc Co., Palmerton, Pa. Res: Horse Head Inn.

Walter Souder Slifer, C.E., with Lehigh Portland Cement Co., Allentown, Pa. Res: 907 Delaware Ave., South Bethlehem, Pa.

*John Clayton Snyder, C.E.

RALPH LUCAS TALLEY, B.A., Asst. Circulation Mgr., Lewis Publishing Co., Box 205 Winner Station, St. Louis, Mo.

JESSE WAGGENER UNDERWOOD, M.E., Contracting Engineer, Cutler-Hammer Mfg. Co., 136 Liberty St., New York, N.Y.

RICHARD WAHLE, E.E., with Northern Electric Co., 29 Broadway, New York, N.Y.

SWINTON BALL WARING, C.E., Acting Div. Eng'r, Bureau of Filtration, Pittsburg, Pa. Res: cor. Eastern & River Aves., Aspinwall, Pa.

WILLIAM HENRY WELKER, A.C., Asst. in Biological Chemistry, College of Physicians and Surgeons, Columbia Univ.; Chemist, Sloane Maternity Hospital, New York, N.Y. Res: 148 W. 67th St.

ARTHUR JAMES WESTON, B.A., A.M. (Yale, '05), Instructor in English, Stevens Institute, Hoboken, N.J.

EMERY STONE WHITNEY, JR., C.E., Asst. Eng'r, Mississippi River Bridge, Chicago & North Western Ry., Clinton, Ia.

RAY FRANKLIN WUNDERLY, C.E., Transitman, Philadelphia Terminal Div., Pennsylvania R.R., 32nd St. & Powelton Ave., Philadelphia, Pa. Res: 3221 Powelton Ave.

CHARLES ERNEST YOST, C.E., Transitman, Missouri Pacific Ry., Crane, Mo.

CLASS OF 1905.

CHARLES EDWARD ALDINGER, M.E., Sales Dept., Bethlehem Steel Co., South Bethlehem, Pa. Res: 428 Cherokee St.

WILLIAM AARON BACHMAN, M.E., Inspector in Machine Shop, Bethlehem Steel Co., South Bethlehem, Pa. Res: Hellertown, Pa.

WILSON S. BARLEY, C.E., Draftsman, American Bridge Co., Ambridge, Pa. Res: 94 Main Street, Fair Oaks, Pa.

AZZEL CLARK BENNETT, M.E., with Dempcy-Degener Co., Empire Bldg., Pittsburg, Pa.

BEN CRANDALL BENTLEY, C.E., 147 South St., Jackson, O.

JOHN DANIEL BERG, M.E., Salesman, Dravo, Doyle & Co., 811 Lewis Bldg., Pittsburg, Pa. Res: 5435 Stanton Ave.

LOUIS FREDERICK BLUME, E.E., Instructor in Experimental Engineering, Cornell University, Ithaca, N.Y. Res: 103 Quarry St.

ROBERT AMOS BOEHRINGER, C.E., Asst. Eng'r, American Pipe Mfg. Co., 112 N. Broad St., Philadelphia, Pa,

WALTER EMERSON BROWN, C.E., Draftsman, Fort Pitt Bridge Works, Canonsburg, Pa.

Frank Horace Browning, M.E., Draftsman, Hull Dept., Fore River Shipbuilding Co., Quincy, Mass. Res: 16 Charles St.

Charles Ely Butz, E.E., Testing Dept., General Electric Co., Schenectady, N.Y. Res: 45 Front St.

Niles Chapman, M.E., Vice-Pres. & Treas., Greenfield Fruit Jar & Bottle Co., Greenfield, Ind. Res: 310 W. Main St.

Herbert Ashmun Church, C.E., Draftsman, Construction Dept., Fairbanks, Morse & Co., Chicago, Ill. Res: 325 Maple Ave., Oak Park, Ill.

Arthur Stevenson Clay, C.E., Eng'r, Pennsylvania State Highway Dept., Harrisburg, Pa. Address: First National Bank Bldg., Bloomsburg, Pa.

Clarence Edward Clewell, E.E., Instructor in Electrical Engineering, Lehigh University, South Bethlehem, Pa. Res: 138 S. New St., Bethlehem, Pa.

Paul Cloke, E.E., with Public Service Corporation of New Jersey, 446 Market St., Newark, N.J. Res: 28 E. Park St.

Dean Corsa, E.M., with New Jersey Zinc Co., Austinville, Va.

John Adlum Dent, M.E., with New York Transit Co., Kilmer Bldg., Binghamton, N.Y.

Emil August Droll, M.E., Sales Eng'r for Ingersoll Rand Co., with Victor M. Braschi & Co., Torreon, Mexico.

Arthur Edgar, A.C., Assistant in Chemistry, Lehigh University, South Bethlehem, Pa. Res: 449 Vine St.

George Pryor Enke, M.E., Chief Inspector, German-American Insurance Co., 35 Nassau St., New York, N.Y. Res: 26 S. Walnut St., East Orange, N.J.

William Lawrence Estes, jr., B.A., Medical Student, Johns Hopkins University, Baltimore, Md. Res: 305 N. Broadway.

Samuel Henry Fleming, E.E., Research Work, E. I. duPont de Nemours Powder Co., Gibbstown, N.J. Res: 1315 Vine St., Philadelphia, Pa.

John Marvin Fouse, E.M.

Nevin Elwell Funk, E.E., Foreman of Construction, Philadelphia Electric Co., Philadelphia, Pa. Res: 548 S. 49th St.

Joseph Newlin Gawthrop, jr., M.E., with Bucyrus Co., South Milwaukee, Wis. Res: 513 Jackson St., Milwaukee, Wis.

Thomas Bragg Gilliam, M.E., with Bethlehem Foundry & Machine Co., South Bethlehem, Pa. Res: 326 Wyandotte St.

Robert Stanley Goerlich, B.A., M.A. ('06), 124 3rd Ave., Bethlehem, Pa.

NATHANIEL COLE HARRISON, M.E., Roll Designer, Gautier Roll Shop, Cambria Steel Co., Johnstown, Pa. Res: Colonial Hotel.

REXFORD ARCHIBALD HARROWER, C.E., Graduate Student, Lehigh University, South Bethlehem, Pa. Res: 528 Cherokee St.

CAMERON DOUGLASS HAYES, E.E., Asst. Sec., Young Men's Christian Association, Schenectady, N.Y. Res: 702 Campbell Ave.

WALTER HILLEARY HENDERSON. C.E., with Crozer Land Association, Elkhorn, W.Va.

ROBERT GARNETT HODGKIN, B.A., Asst. Freight & Traffic Mgr's Office, Southern Ry., 308 Equitable Bldg., Atlanta, Ga.

HENRY WILLIAM HOEKE, M.E., with Water Dept., District Bldg., Washington, D.C. Res: 116 7th St., S.E.

ELMER BARR HOSTETTER, M.E., Draftsman, Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: 323 Pitt St., Wilkinsburg, Pa.

J. G. HUNT ISERT, M.E., Mechanical Eng'r for W. T. Pyne Mill and Supply Co., 1301 W. Main St., Louisville, Ky.

EARLEY MCILHENNY JOHNSON, E.M., with Railway Steel Spring Co., Latrobe, Pa. Res: 511 Main St.

JOHN TAGGART JONES, M.E., Highway Dept., Standard Steel Works, Burnham, Pa. Res: 32 N. Dorcas St., Lewistown, Pa.

MICHAEL DONALD JONES, C.E., with Lehigh Coal & Navigation Co., Lansford, Pa.

RAY C. KAUTZ, E.M., Inspector, U. S. Engineering Dept., Berlin Bldg., Tacoma, Wash. Res: 246 S. Cliff Ave.

RALPH G. KIRK, Met.E., Eng'r, Mining Improvements, Cornwall Ore Banks, Rexmont, Pa.

WILLIAM CORSON KLINE, C.E., with Pennsylvania, New York & Long Island R.R., Long Island City, N.Y. Res: 142 3rd St.

HARRY OSCAR KOCH, C.E., Dist. Foreman, Laclede Gas Light Co., 4000 Morgan St., St. Louis, Mo.

MICHAEL HENRY KURYLA, M.E., Equipment Record of the United States & Mexican Mines, American Smelters Security Co., 71 Broadway, New York, N.Y., Velardeña, Durango, Mexico.

WILLIAM HENRY LARKIN, JR., M.E., Inspector, Standard Steel Car Co., Butler, Pa. Res: 619 Fairview Ave.

HENRY QUIMBY LAYMAN, M.E., Engineering Dept., Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

JAMES FULTON LEONARD, C.E., Draftsman, Office of Eng'r of Bridges, Pennsylvania R.R. Lines West of Pittsburg, 1115 Union Station, Pittsburg, Pa.

WILLIAM HENRY LESSER, M.E., with Philadelphia & Reading Coal & Iron Co., Pottsville, Pa. Res: 604 N. 3rd St.

WILLIAM HENRY LYNCH, JR., C.E., Asst. Eng'r, State Highway Dept., Harrisburg, Pa. Res: 314 Boas St.

WALLACE MARTIN, B.A., Student, General Theological Seminary, New York, N.Y. Res: 408 Graham Ave., Paterson, N.J.

JAMES ALEXANDER MEASE, M.E., with National Tube Co., Lorain, O. Res: 339 5th St., Elyria, O.

NORMAN NATHANIEL MERRIMAN, B.A., with *Engineering Digest*, 220 Broadway, New York, N.Y.

GEORGE STICKLE MERVINE, E.E., Telephone Eng'r, New York Telephone Co., 15 Dey St., New York, N.Y. Res: 153 E. 86th St,

THOMAS BENJAMIN MICKLEY, E.E., Plant Dept., New York Telephone Co., 15 Dey St., New York, N.Y. Res: 153 E. 86th St.

ARTHUR FREDERICK MURRAY, M.E., with Elliott Fisher Typewriter Co., Harrisburg, Pa.

CLARENCE HERR OHLWILER, A.C., Asst. Chemist, Pennsylvania R.R., Altoona, Pa. Res: 1606 7th Ave.

HARRY LAFFAYETTE PENTZ, C.E., Eng'r of Construction, Bethlehem Steel Co., South Bethlehem, Pa.

WILLIAM MONTGOMERY PERSON, C.E., with Maryland Steel Co., Sparrows Point, Md.

EARL VICTOR PHELPS, E.E., Asst. Eng'r, Rowland Telegraphic Co., Washington, D.C. Res: 733 10th St., N.E.

HARRY WEISER PROTZELLER, E.E., Testing Dept., General Electric Co., Schenectady, N.Y. Res: 702 Campbell Ave.

EDWIN LOUIS RICH, E.E., Patent Dept., General Electric Co., Schenectady, N.Y. Res: 43 Front St.

JOHN ALOYSIUS RUDDY, C.E., Transitman, Delaware, Lackawanna & Western R.R., Scranton, Pa. Res: 523 Emmett St.

FRANCIS C. RYAN, Met.E., Chief Chemist, United States Metals Refining Co., Grasselli, Ind. Res: 1 Williams St., Hammond, Ind.

CHARLES EDGAR RYDER, C.E., Asst. Eng'r, Water Supply Commission of Pennsylvania, Harrisburg, Pa. Res: 223 N. 2nd St.

GEORGE HENRY SCHAEFFER, E.E., Construction Foreman, General Electric Co., Witherspoon Bldg., Philadelphia, Pa.

EDGAR HENRY SCHMIDT, C.E., Chief of Party, Delaware, Lackawanna & Western R.R. Corps. Res: 125 Market St., Bangor, Pa.

WILLIAM RUSSELL SCHNABEL, C.E., 212 E. Broad St., Bethlehem, Pa.

Carl Theodore Schwarze, B.S. (Cooper Union), C.E., Senior Instructor in Civil Engineering, Cooper Institute, Cooper Sq., New York, N.Y. Res: 404 6th St., Brooklyn, N.Y.

Alan deSchweinitz, B.A., Clerk, Contract Dept., New York Central & Hudson River R.R., 521 Grand Central Station, New York, N.Y. Res: 49 Park Ave.

James Alton Seacrest, C.E., Bridge Eng'r, Lehigh Valley R.R., South Bethlehem, Pa. Res: 704 Dakota St.

Horace Schultz Seipt, C.E., Engineering Corps, Delaware, Lackawanna & Western R.R., Hoboken, N.J. Res: 47 S. 11th St., Newark, N.J.

Charles Augustus Shaffer, M.E., Eng'r for Hoshor-Platt Co., Box 519, New Orleans, La.

Joseph Shema, C.E., with Belmont Iron Works, Philadelphia, Pa. Res: 3151 Catherine St.

George Henry Shenberger, M.E., with Atlas Portland Cement Co., Northampton, Pa.

George Arthur Sisson, C.E., Junior Eng'r, U.S. Engineering Dept., Corregidor Island, P. I.

Alfred Pollitt Smith, C.E., 933 N. Calvert St., Baltimore, Md.

Richard Hendon Smith, E.E., Draftsman, Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: 323 Pitt St., Wilkinsburg, Pa.

Frank Bausman Snyder, M.E., Asst. Master Mechanic, Rail Mill, Maryland Steel Co., Sparrows Point, Md. Res: 508 C St.

Ned Herbert Snyder, M.E., Field Asst., Technical Branch, U. S. Geological Survey, Washington, D.C.

Percifor Gybbon Spilsbury, E.M., with Greene Consolidated Copper Co., Cananea, Sonora, Mexico.

Harold Tuttle Stearns, M.E., with United Gas Improvement Co., Philadelphia, Pa.

Lucien N. Sullivan, B.S. (Rose Polytechnic Inst.), M.S., Chief Eng'r, Compañia de Real del Monte y Pachuca, Pachuca, Hidalgo, Mexico.

Richard Ryland Thompson, C.E., with Waring, Chapman & Farquhar, Civil Eng'rs, 874 Broadway, New York, N.Y.

Russell Raymond Tirrop, M.E., with Ontario Iron & Steel Co., Welland, Ontario, Canada.

William Julian von Borries, E.M., Supt., Sewanee Coal, Coke & Land Co., Coalmont, Tenn.

Harry Samuel Walker, M.E., Gen. Supt.'s Office, Bethlehem Steel Co., South Bethlehem, Pa.

JOHN HENLEY WALKER, A.B. (Randolph-Macon College), C.E., Asst. Supt., Concrete Construction of Hoboken Terminal, Hudson Co., Hoboken, N.J. Res: 301 Hudson St.

GEORGE J. WALZ, E.E., Asst. Eng'r, Pennsylvania Steel Co., Steelton, Pa. Res: 207 S. 3rd St.

ALONZO LEACH WARE, C.E., Civil Eng'r, Construction Dept., Pennsylvania R.R., Mt. Union, Pa.

CLARENCE BAILEY WHITE, A.C., of White & Bro., Smelters & Refiners, 1505 E. Montgomery Ave., Philadelphia, Pa. Res: 1421 Erie Ave.

ALBERT JONES WILLIS, C.E., Instructor in Civil Engineering, Lehigh University, South Bethlehem, Pa. Res: 722 Cherokee St.

JAMES HUNTER WILY, E.E., Instructor in Physics, Lehigh University, South Behtlehem, Pa. Res: 704 Dakota St.

JAMES HAROLD WOLFE, M.E., Machinery Business, with Victor M. Brasclis Co., Mexico City, Mexico.

*CHARLES HAROLD YOUNG, B.A.

CLASS OF 1906.

WILLIAM MACE-DOUGLAS BARNES, E.M., Mining Eng'r, Box 131, Prescott, Ariz.

CALVIN WILLIAM BARWIS, C.E., Maintenance of Way Dept., Pennsylvania R.R., 116 Union Station, Pittsburg, Pa. Res: 222 Carver St., E.E.

MEAD REGINALD BECK, B.A., Teacher, High School, South Bethlehem, Pa. Res: 9 N. Main St., Bethlehem, Pa.

WALTER CARL BENEDICT, C.E., Levelman, Engineering Dept. of New York State, Concrete Lock Construction, Box 26, Whitehall, N.Y.

LEWIS SAMUEL BIRELY, C.E., York Road, Md.

LEWIS GILBERT BISHOP, E.E., with Westinghouse Electric & Mfg. Co., Seattle, Wash.

DAVID HERBST BRILLHART, C.E., with Engineering Corps, Chicago & Northwestern Ry. Res: 419 6th Ave., Clinton, Iowa.

AUBREY LEVIS BROOMALL, E.E., Construction Dept., Westinghouse Electric & Mfg. Co. Res: 330 Irving Ave., Port Chester, N.Y.

JOSÉ ANTHONY BUCH, C.E., with Department of Public Works, Santiago, Cuba. Res: Sagarra alta 43.

HARVEY MILLER BURKEY, El.Met., with Metallurgical Co. of America, 52 Broadway, New York, N.Y. Res: 253 N. 7th St., Newark, N.J.

WILLIAM DEAKINS CASSIN, E.E., Engineering Dept., Chesapeake & Potomac Telephone Co., 711 12th St., Washington, D.C. Res: 1413 30th St.

MORTON HAZEN CHASE, M.E., Asst. Resident Eng'r, E. I. duPont de Nemours Powder Co., Newhall, Me.

DOUGLASS MEEKER CLAWSON, E.E., Supervisor, New York Telephone Co., 18 Cortlandt St., New York, N.Y. Res: 1 Willow Pl., Mt. Vernon, N.Y.

CHESTER PHILIP CLINGERMAN, M.E., Rolling Mill Dept., National Tube Co., McKeesport, Pa.

STEWART JOSEPH CORT, El.Met., Open Hearth Dept., Duquesne Steel Works, Duquesne, Pa. Res: 2212 Osgood St., Allegheny, Pa.

JOSEPH FREDERICK COTTRELL, M.E., with Vulcanite Portland Cement Co., Phillipsburg, N.J. Res: 619 Ferry St.

JOHN SUMMERFIELD CROWTHER, JR., M.E., with Maryland Steel Co., Sparrows Point, Md. Res: 603 C St.

ALFRED WARREN CUPITT, M.E., Experimental Dept., American Multigraph Co., Cleveland, O. Res: 6218 Euclid Ave.

HART BLAYNEY DAUGHERTY, C.E., Asst. Eng'r, Irrigated Lands Co., Salt Lake City, Utah. Res: Price, Utah.

DION KANOUSE DEAN, M.E., Draftsman, B. F. Sturtevant Co., 131 Liberty St., New York, N.Y. Res: Jaques Ave., Rahway, N.J.

CLYDE DENLINGER, A.C., with Cambria Steel Co., Johnstown, Pa. Res: 244 Market St.

HARRY CORTLAND DENT, M.E., with Sayles Bleacheries, Saylesville, R.I. Res: 22 Manchester St., Pawtucket, R.I.

JOHN CYRUS DISTLER, M.E., with A. D. Granger Co., Contracting Eng'rs, 1304 Commonwealth Bldg., Philadelphia, Pa.

ROBERT SAMUEL DRUMMOND, M.E., with Williams, White & Co., Moline, Ill. Res: 1901 6th Ave.

RALPH SELDEN EDMONDSON, C.E., with Ashmead & Hackney, Civil Eng'rs, 622 Bartlett Bldg., Atlantic City, N.J. Res: 25 S. Pennsylvania Ave.

HENRY FREDERICK EIGENBRODT, M.E., Asst. Eng'r, E. I. duPont de Nemours Powder Co., Sedalia, Col.

MORRIS DEBERTHOLETTE EVANS, E.M., Eng'r & Assayer, Inde Gold Mining Co., Inde, Durango, Mexico.

MARCUS MARTIN FARLEY, C.E., Asst. Eng'r, Board of Water Supply of New York City, 299 Broadway, New York, N.Y. Res: 215 W. 23rd St.

THOMAS GEORGE FEAR, M.E., Mechanical Eng'r, Buck Run Coal Co., Minersville, Pa. Res: 621 Depot St., Scranton, Pa.

JOHN HOWARD FORD, E.E., with Bureau of Public Works, Manila, P.I. Res: San Fernando, Pampanga, P.I.

ALBERT WESLEY GAUMER, C.E., with Juragua Iron Co., Santiago, Cuba.

CHARLES FREDERICK GILMORE, B.A., Editorial Dept., Grit Publishing Co., Williamsport, Pa. Res: 725 6th Ave.

THOMAS LESLIE GOSSLING, E.E., Specification Writer (care S. B. Williams), Bell Telephone Co., 13th & Arch Sts., Philadelphia, Pa. Res: 1470 N. 52nd St.

ESTEP TILLARD GOTT, C.E., Shaft Sinking, Wylam, Ala.

WILLIAM HENRY GRADY, E.M., with Lehigh Coal & Navigation Co., Lansford, Pa.

AUGUSTINE EDWARD GREENE, M.E., with New Departure Mfg. Co., Bristol, Conn. Res: 148 High St.

JOHN HUSTON CLARK GREGG, C.E., Asst. Eng'r, Board of Water Supply of New York City, New Paltz, N.Y.

WILLIAM HEYWARD GRIMBALL, M.E., Charleston, S.C.

ROGER SAMUEL STOCKTON GUERBER, C.E.

CLAUDE BENNEVILLE HAGY, C.E., Instructor in Physics & Chemistry, Central High School, Philadelphia, Pa. Res: 1313 Green St.

YELLOTT FITZHUGH HARDCASTLE, El.Met., Metallurgical Chemist, Old Dominion Copper Mining & Smelting Co., Globe, Ariz. Res: Dominion Hotel.

EDWIN PAUL HAYES, M.E., Farming, R. F. D. 2, Eufaula, Ala.

WILLIAM HOMER HENDRICKS, Met.E., Asst. Supt., Lithopone & Sulphuric Acid Depts., New Jersey Zinc Co., Palmerton, Pa. Res: Horsehead Inn.

FRANK ANDERSON HENRY, Ch.E., with General Chemical Co., Laurel Hill, New York, N.Y. Res: 179 Marcy Ave., Brooklyn, N.Y.

PAUL HENRY HERMAN, B.A. (St. John's), El.Met., with Maryland Steel Co., Sparrows Point, Md. Res: 1623 Eutaw Pl., Baltimore, Md.

*JESSE EDWARDS HUMPHREYS, C.E.

CLARENCE ARTHUR JACOBY, E.E., Plant Dept., New York Telephone Co., 15 Dey St., New York, N.Y. Res: 464 4th Ave., Roseville, N.J.

JOHN RICHARD JAMES, M.E., Engineering Dept., Sayles Bleacheries, Saylesville, R.I. Res: 22 Manchester St., Pawtucket, R.I.

FRANK WARE JEFFERSON, M.E., with Struthers-Wells Co., Warren, Pa.

EDWARD EVERETT JOHNSTON, C.E., Civil Eng'r, 111 N. Charles St., Baltimore, Md. Res: 2622 N. Charles St.

MILTON DAY KIRK, E.M., Mining Eng'r, with J. A. Weaver & Co., Starford, Pa.

THOMAS NORMAN LACEY, E.E., Maintenance Dept., American Telephone & Telegraph Co., 778 Bourse Bldg., Philadelphia, Pa. Res: 1601 Mt. Vernon St.

HERBERT HOUGHTON LAUER, E.M., Assayer & Chemist, Arizpe Mining Co., Canánea, Sonora, Mexico.

HARRY RILEY LEE, B.S. (Rutgers), El.Met., with Virginia Electrolytic Co., Holcomb Rock, Va.

CHARLES WELLS LOTZ, M.E., with Bethlehem Steel Co., South Bethlehem, Pa. Res: 309 3rd St.

THOMAS HARRISON LÜDERS, M.E., with Phosphor Bronze Smelting Co., 2200 Washington Ave., Philadelphia, Pa. Res: 1909 Pine St.

ROSWELL SILAS MCMULLEN, C.E., Supt., Morss Hill Coal Co., Carbondale, Pa. Res: 27 Belmont St.

GILBERT PETERS MCNIFF, E.M., with Duquesne Works, Carnegie Steel Co., Munhall, Pa. Address: Box 697.

J. TERENCE MCVEY, C.E., Maintenance of Way Dept., Delaware, Lackawanna & Western R.R., Hoboken, N.J.

PAUL DONALD MARCH, M.E., Industrial Engineer, American Thread Co., Holyoke, Mass. Res: 325 Appleton St.

HARRY CUTHBERTSON MARSHALL, M.E., with Exploration Syndicate, Copper Flat Mines, Hanover, N.M.

DANIEL ALFRED MAURER, E.E., with Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: 327 Pitt St., Wilkinsburg, Pa.

THOMAS ANDREW HAMMERSLEY MAWHINNEY, B.A., Asst. in German, Lehigh University, South Bethlehem, Pa. Res: 542 Chestnut St.

JOSÉ M. MENDOZA, M.E., Malambito 779, Lima, Peru.

LEOPOLDO MERCADER, C.E., Bridge Inspector, Bureau of Public Works, San Juan, Porto Rico. Res: Aguadilla, Porto Rico.

RICHARD MANSFIELD MERRIMAN, C.E., Resident Eng'r, Erie R.R., Central Valley, N.Y.

KENNETH MILLS, C.E., Asst. Eng'r of Mines, Jacala, Hidalgo, Mexico.

AUSTIN WILFORD MOORE, El.Met., with R. W. Day, Contractor, Northern Electric Street Ry. Co., 519-520 Connell Bldg., Scranton, Pa. Res: 63 W. Parker St.

Francis Rogers Pyne, El.Met., Metallurgical Chemist, Boston & Montana Consolidated Copper & Silver Mining Co., Great Falls, Mont.

Rossiter W. Raymond, Ph.D., LL.D. (Honorary), Mining Eng'r; Sec., American Institute of Mining Eng'rs, 29 W. 39th St., New York, N.Y. Res: 123 Henry St., Brooklyn, N.Y.

Robert Bruce Rench, E.E., Testing Dept., General Electric Co., Schenectady, N.Y. Res: 14 N. Ferry St.

Richard Roy Renner, C.E., Bridge Eng'r's Office, Lehigh Valley R.R., South Bethlehem, Pa. Res: 511 Seneca St.

William Henry Roberts, E.M., Asst. Eng'r, Rock Island Coal Co., Hartshorne, I.T.

Benjamin Trexler Root, M.E., Supt. of Machine Shop, B. M. Root Co., York, Pa. Res: 432 W. Philadelphia St.

Samuel Henry Salisbury, jr., A.C., Student, Massachusetts Institute of Technology, Boston, Mass. Res: 5 St. James Ave.

Carleton Meredith Schoonover, E.E., Student Course of Stanley G. I. Electric Mfg. Co., Pittsfield, Mass. Res: 70 Dalton Ave.

David Norman Showalter, C.E., Asst. to Designing Eng'r, St. Lawrence River Power Co., Massena, N.Y.

Marvin White Singer, M.E., Motive Power Dept., Pennsylvania R.R., Altoona, Pa. Res: University Club.

James Albert Smith, M.E., Heating & Sanitary Eng'r, with A. C. Smith & Co., 487 Broadway, Newburgh, N.Y. Res: 3 North St.

Newton Guy Smith, C.E., Draftsman, Fort Pitt Bridge Works, Canonsburg, Pa. Res: 219 Belmont Ave.

Walter Crispell Smith, A.C., Chemist, Research Dept., U. S. Metals Refining Co., Chrome, N.J. Address: care Y. M. C. A., Elizabeth, N.J.

Judson Gray Smull, A.C., Chemist, Dept. of Mines, New Jersey Zinc Co., Franklin Furnace, N.J.

Milton Ellis Spear, E.E., Testing Dept., General Electric Co., Schenectady, N.Y. Res: 39 Front St.

Howard Raymond Stocker, C.E., Asst. Eng'r, Board of Water Supply of New York City. Address: Box 27, Monocacy Station, Pa.

Christian S. Stouffer, E.E., with Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: 177 Gordon St., Swissvale, Pa.

George Levick Street, jr., M.E., Foreman, Engine Testing Dept., Autocar Co., Box 683, Ardmore, Pa.

EDWARD RUSSELL TATTERSHALL, C.E., Transitman, Maintenance of Way Dept., New York Central & Hudson River R.R., Weehawken, N.J. Address: Asst. Eng'r's Office.

HORACE RICHMOND THAYER, B.S. (Mass. Inst. of Tech.), M.S., Teacher of Civil Engineering, Carnegie Technical Schools, Pittsburg, Pa. Res: 712 S. Linden Ave.

TALBOT TODD, C.E., with Great Western Power Co., Oroville, Cal.

CHARLES NOURSE UNDERWOOD, M.E., with Sayles Bleacheries, Saylesville, R.I. Res: 22 Manchester St., Pawtucket, R.I.

EUGENE ERIC VALK, E.E., Testing Dept., General Electric Co., Schenectady, N.Y. Res: 14 N. Ferry St.

PHILIP RICORD VANDUYNE, B.A., in Law Office of Pitney, Hardin & Skinner, Prudential Bldg., Newark, N.J. Res: 350 Summer Ave.

REENEN JACOB VANREENEN, B.A. (Univ. of Cape of Good Hope), C.E., Arthur's Road, Sea Point, Cape Colony, S.A.

FRANK ALBERT VOCKRODT, E.M., Operating Dept., United States Gypsum Co., Gypsum, O. Address: 22 Meridan St., Pittsburg.

JOHN RUSSELL WAIT, M.E., Blast Furnace Dept., Pennsylvania Steel Co., Steelton, Pa. Res: 237 Walnut St.

JOHN HARVEY WALLACE, M.E., 3715 Spring Garden St., Philadelphia, Pa.

EDGAR CHARLES WEINSHEIMER, E.M., Ashland Mine, Cleveland Cliffs Iron Co., Ironwood, Mich.

LEE PORTER WRAY, C.E., Maintenance of Way Dept., Philadelphia, Baltimore & Washington Div., Pennsylvania R.R., Wilmington, Del. Res: 916 West St.

FRANCIS GERMAN WRIGHTSON, JR., C.E., Asst. Eng'r, Vielé, Cooper & Blackwell Construction Co., Consulting Eng'rs, 49 Wall St., New York, N.Y., at Great Western Power Co., Oroville, Cal.

JOHN JAMES YOUNG, JR., C.E., Transitman, Philadelphia & Reading Ry., Williamsport, Pa. Res: 1162 Erie Ave.

CLASS OF 1907.

WILLIAM DREES AIKEN, C.E., with Tennessee Coal, Iron & R.R. Co., Ensley, Ala. Res: 2119 Ave. F.

WALTER JACOB AMMER, M.E., Armor Plate Dept., Bethlehem Steel Co., South Bethlehem, Pa. Res: 216 N. Main St., Bethlehem.

HARRY FRAZIER ANDERS, E.M., with Cleveland-Cliffs Iron Co., Ishpeming, Mich. Res: 112 Bluff St.

RALPH S. ARCHIBALD, E.M., Asst. Geologist, Cleveland-Cliffs Iron Co., Ishpeming, Mich. Res: 112 Bluff St.

CHARLES LUTHER BACHMAN, M.E., Inspector, German-American Fire Insurance Co., Liberty & Nassau Sts., New York, N.Y. Res: 26 S. Walnut St., East Orange, N.J.

GEORGE MILFORD BAKER, E.E., Testing Dept., General Electric Co., Schenectady, N.Y. Res: 33 N. Ferry St.

HOWARD LEFFINGWELL BALDWIN, C.E., Bridge Dept., Oregon Short Line R.R., Deseret News Bldg., Salt Lake City, Utah. Res: 224 Brigham St.

ROBERT ASHTON BAYARD, M.E., Inspector, German-American Fire Insurance Co., Liberty & Nassau Sts., New York, N.Y. Res: 26 S. Walnut St., East Orange, N.J.

HENRY CHARLES BECKER, C.E., Asst. Eng'r of Way, Norfolk & Portsmouth Traction Co., Norfolk, Va.

JOHN WARFEL BEYER, A.B. (Franklin & Marshall), E.E., with General Electric Co., Schenectady, N.Y. Res: 33 N. Ferry St.

RICHARD GUY BRINDLE, M.E., Mfg. Dept., Corn Products Mfg. Co., Heyworth Bldg., Chicago, Ill.

JOHN ANDRÉ BRODHEAD, M.E., with Bethlehem Steel Co., South Bethlehem, Pa. Res: 31 N. New St., Bethlehem, Pa.

PAUL LORENZO BROOKE, C.E., with McClintic-Marshall Construction Co., Pottstown, Pa. Res: 224 King St.

ORLANDO WEATHERS BUMP, C.E., Asst., Maintenance of Way Dept., Logansport Div., Pennsylvania Lines West of Pittsburg, Logansport, Ind.

JOHN BRUCE CARLOCK, E.M., Blast Furnace Dept., Bethlehem Steel Co., South Bethlehem, Pa. Res: 326 Wyandotte St.

ROLLIN LANDIS CHARLES, B.A., Instructor in Physics, Lehigh University, South Bethlehem, Pa. Res: 224 Lehigh St., Allentown, Pa.

WILLIAM WALTON CRAWFORD, E.E., with Electrical Testing Laboratories, 80th St. & East End Ave., New York, N.Y.

ROBERT EMMETT CULLEN, C.E., Asst. Eng'r, Washington & Berkeley Bridge Co., Williamsport, Md.

CLAUDE MAHLON DANIELS, C.E., Resident Eng'r, for McClintic-Marshall Construction Co., Schenectady, N.Y.

ARTHUR ALBERT DAVIS, C.E., Instructor in Mathematics and English, Mackenzie College, Sao Paulo, Brazil.

WILLIAM LANE DEBAUFRE, E.E., Engineering Apprentice, Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: 822 Franklin Ave., Wilkinsburg, Pa.

ALFRED SHAFFNER DEHUFF, M.E., with McClintic-Marshall Construction Co., Rankin, Pa. Res: 219 Swissvale Ave., Swissvale, Pa.

HENRY DANIEL DESH, M.E., Testing Dept., Corn Products Mfg. Co., 42 E. Madison St., Chicago, Ill.

SAMUEL ERNEST DOAK, E.M., 1502 N. 15th St., Philadelphia, Pa.

CHARLES DORRANCE, E.M., Oxide Dept., New Jersey Zinc Co., South Bethlehem, Pa. Res: 821 Delaware Ave.

WILLIAM ALBERT DRAPER, C.E., U. S. Eng'r's Office, Washington, D.C. Res: 325 A St., S.E.

GEORGE ANTHONY DUNN, C.E., 1625 Ritner St., Philadelphia, Pa.

HERBERT PANNEBECKER DYSON, E.M., Asst. Eng'r, Poland Mining Co., Poland, Ariz.

CLARENCE LINCOLN EASTMAN, E.E., in charge of Electrical Equipment, Crucible Steel Co. of America, Jersey City, N.J. Res: 940 Broad St., Newark, N.J.

JOHN HERBERT FARRELL, E.M., Geological Dept., American Smelting & Refining Co., 71 Broadway, New York, N.Y.

AMBROSE JOSEPH FASENMYER, C.E., New Bethlehem, Pa.

EDWARD STANIFORD FOSTER, E.E., Instructor in Electrical Engineering, Lehigh University, South Bethlehem, Pa. Res: 514 Dakota St.

GEORGE EDMUND FOX, C.E., Rodman, Pennsylvania R.R., Union Station, Pittsburg, Pa. Res: 7049 Hamilton St.

ISADORE JAMES FREEDMAN, B.A., with Asst. Eng'r, Pittsburg Div., Pennsylvania R.R., 116 Union Station, Pittsburg, Pa. Res: 7718 Juniata St., E.E.

RALPH JOHN GILMORE, B.A., Assistant in Biology, Lehigh University, South Bethlehem, Pa. Res: B 37, Taylor Hall.

EDGAR FREDERICK GOHL, C.E., with McClintic-Marshall Construction Co., Pottstown, Pa. Res: 529 High St.

ROULON JAMES GREEN, E.E., with General Electric Co., Schenectady, N.Y. Res: 33 N. Ferry St.

MONTGOMERY JAMES GREENOUGH, C.E., with Underwriters' Association of the Middle Dept., 316 Walnut St., Philadelphia, Pa.

HENRY JOSEPH GROENINGER, C.E., with National Tube Co., Frick Bldg. Annex, Pittsburg, Pa. Res: 415 McNair Ave., Wilkinsburg, Pa.

CHARLES AARON GROSS, C.E., Structural Steel Salesman, Bethlehem Steel Co., South Bethlehem, Pa. Res: 109 W. 4th St.

AUGUST BERNARD GRUBMEYER, E.E., with General Electric Co., Schenectady, N.Y.

Arthur Arton Hamerschlag, Sc.D. (Honorary), Director of the Carnegie Technical Schools, Schenley Park, Pittsburg, Pa. Res: 4902 Forbes St.

John Faber Hanst, E.M., with Cleveland-Cliffs Iron Co., Austin Mine, Princeton, Mich.

Ferdinand Eugune Hayes, jr., C.E., Instructor in Civil Engineering, College of St. Thomas, Box 30, Villanova, Pa.

George Kurt Herzog, El.Met., with Aluminum Co. of America, Niagara Falls, N.Y. Res: 207 3rd St.

Alfred William Hesse, E.M., Div. Eng'r, Fairmont Coal Co., Clarksburg, W.Va. Res: cor Philippi & Depot Sts.

Robert Alexander Hooke, C.E., 616 George St., Chattanooga, Tenn.

Frederick Roland Horne, C.E., with McLaughlin Bros., Box 27, Bayamo, Cuba.

Oliver Zell Howard, M.E., Experiment Station, U. S. Naval Academy, Franklin & Cathedral Sts., Annapolis, Md. Res: 34 East St.

Edgar Philemon Hulse, M.E., Engineering Dept., John A. Roebling's Sons Co., Trenton, N.J. Res: 51 Wilkinson Pl.

Frederick Gordon Hurst, C.E., Graduate Student, University of Washington, Seattle, Wash. Res: 1421 E. 45th St.

Gilbert Garfield Jacobosky, C.E., Civil & Consulting Eng'r, 116 Second Nat'l Bank Bldg., Wilkes-Barre, Pa. Res: 211 S. Main St.

David William Jardine, M.E., with American Gas Co., 222-224 S. 3rd St., Philadelphia, Pa. Res: 315 S. Hicks St.

Earle Frederick Johnson, C.E., with McClintic-Marshall Construction Co., Pottstown, Pa. Res: 424 King St.

Reverdy Hamlin Jones, C.E., 224 N. Park Ave., Norfolk, Va.

Frank Ulrich Kennedy, C.E., with McClintic-Marshall Construction Co., Pottstown, Pa. Res: 424 King St.

Gordon Eugene Kent, C.E., with Dravo Contracting Co., of Pittsburg, Pa., Government Dam Work, Beaver, Pa.

Edmund Geddes King, C.E., with F. H. Clement & Co., Railroad Contractors, Land Title Bldg., Philadelphia, Pa., located with Erie R.R., Middletown, N.Y.

Ralph Wilhelm Kinsey, B.A., Reporter, *The Herald*, Reading, Pa. Res: 42 S. 3rd St.

Charles Theodore Kriebel, E.M., with Cleveland Cliffs Iron Co., Ishpeming, Mich.

ROBERT LOUIS LAFFERRANDER, B.S. (in Chemistry), with New Jersey Zinc Co., South Bethlehem, Pa.

ALFRED WILLIAM LAWSON, E.E., with Westinghouse Electric & Mfg. Co., Pittsburg, Pa. Res: Wilkinsburg, Pa.

THOMAS MINOR LESHER, M.E., with McClintic-Marshall Construction Co., Rankin, Pa. Res: 200 Centre St., Swissvale, Pa.

JOHN GABRIEL LOOSE, M.E., Inspector, German-American Fire Insurance Co., Liberty & Nassau Sts., New York, N.Y. Res: 26 S. Walnut St., East Orange, N.J.

CLAIR MILLER LOUCKS, C.E., Asst. to Chief Eng'r, Guerber Engineering Co., Bethlehem, Pa. Res: 520 Pawnee St., South Bethlehem, Pa.

ROBERT MACMINN, C.E., with McClintic-Marshall Construction Co., Pittsburg, Pa. Res: 304 Gray Bldg., Wilkinsburg, Pa.

HAROLD AUSTIN MCINTOSH, C.E., Instructor in Civil Engineering, Mackenzie College, Sao Paulo, Brazil.

EDWARD MARIUS MCNALLY, M.E., with Bethlehem Steel Co., South Bethlehem, Pa. Res: 550 Chestnut St.

PHILIP OUTERBRIDGE MCQUEEN, C.E., Rodman, Location Work, Erie R.R., Shohola, Pa.

ROBERT UPTON PAUL MACKALL, M.E., with Bethlehem Steel Co., South Bethlehem, Pa. Res: Packer Ave.

ALBERT JACOB MAYER, M.E., Drop Forge Dept., Bethlehem Steel Co., South Bethlehem, Pa. Res: 422 Cherokee St.

RODNEY AUGUSTUS MERCUR, JR., M.E., with Youngstown Sheet & Tube Co., Youngstown, O. Res: 260 Lincoln Ave.

WILLIAM R. MEYERS, E.M., Asst. Eng'r, Ashland Mine, Cleveland-Cliffs Iron Co., Ironwood, Mich.

LEDLIE DOMINICK MOORE, E.M., Chatham, N.J.

LEVIN ALEXANDER MOORE, M.E., with Corn Products Mfg. Co., 1811 Heyworth Bldg., Chicago, Ill. Res: 260 Seminary Ave.

SAMUEL REA MORRIS, M.E., Experimental Dept., National Tube Co., McKeesport, Pa. Res: 2200 Jenny Lind St.

LAWRENCE BERT MYERS, C.E., Transitman, Railroad Work, Harris Engineering Co., Darby, Pa. Res: 1821 N. 17th St., Philadelphia, Pa.

WILLIAM EDWARD NICHOLSON, C.E., Transitman, New York Div., Erie R.R. Div. Eng'r's Office, Jersey City, N.J. Res: 252½ 9th St.

EVERARD LECOMPTE PATTISON, C.E., with Vielé, Cooper & Blackwell, Consulting Eng'rs, 49 Wall St., New York, N.Y. Address: care Great Western Power Co., Oroville, Cal.

NATHANIEL RAMSAY PENNYPACKER, E.M., Mining Eng'r, Tonopah, Nev.

JOSEPH IRVING PORTER, E.E., with Westinghouse Electric & Mfg. Co., Pittsburg, Pa.

ROBERT STREETER PORTER, C.E., with R. V. Norris, Consulting Eng'r, 2nd National Bank Bldg., Wilkes-Barre, Pa. Res: 140 W. River St.

HENRY JAMES PRECHTL, B.A., 1351 Lake St., Elmira, N.Y.

WARREN ALBERT QUADENFIELD, El.Met., with Bucyrus Co., Milwaukee, Wis.

ANDREW CARNEGIE RAMSAY, E.M., 503 Maple Ave., Greensburg, Pa.

GEORGE KUNKEL REEL, Met.E., with Pennsylvania Steel Co., Steelton, Pa. Res: 1119 N. 3rd St., Harrisburg, Pa.

JOSEPH BENSON REYNOLDS, B.A., Instructor in Mathematics, Lehigh University, South Bethlehem, Pa. Res: 323 Packer Ave.

PHILIP RAINEY ROPER, M.E., with Great Lakes Construction Co., 1117 Chamber of Commerce Bldg., Buffalo, N.Y.

CLARENCE KNIGHT ROULSTON, C.E., 108 E. 25th St., Baltimore, Md.

JOHN THOMAS ROWE, C.E., 156 Melrose Ave., Hampton, Va.

MANUEL TEOFILO SALDAÑA, E.E., with Denver Gas & Electric Co., Denver, Col. Res: 1537 Pearl St.

JOSEPH CHARLES SANDORF, E.E., Testing Dept., General Electric Co., Schenectady, N.Y. Res: 202 State St.

JOSEPH RALPH SCARLETT, C.E., Levee Inspector, U. S. Eng'r's Office, Helena, Ark.

MARTIN HENRY SCHMID, M.E., Asst. Master Mechanic, Corn Products Mfg. Co., Granite City, Ill. Res: 2121 C St.

TRUMAN GROSS SCHNABEL, B.A., Medical Student, University of Pennsylvania, Philadelphia, Pa. Res: 3731 Locust St.

EDGAR SCHWEITZER, M.E., with Youngstown Sheet & Tube Co., Youngstown, O.

JOHN DENNY SCOTT, M.E., Testing Dept., Corn Products Mfg. Co., 42 E. Madison St., Chicago, Ill.

ELMER FREDERICK SHAFFER, JR., M.E., Sales Dept., Bethlehem Steel Co., South Bethlehem, Pa. Res: 511 Seneca St.

MARTIN LUTHER HOFFA SMITH, M.E., with Dravo Contracting Co., 814 Lewis Blk., Pittsburg, Pa.

MATTHEW LINCOLN SMITH, C.E., Rodman, Pennsylvania R.R., Office of Asst. Eng'r, Williamsport, Pa. Res: 740 Grace St.

Shaler Gordon Smith, C.E., with McClintic-Marshall Construction Co., Rankin, Pa. Res: 304 Gray Bldg., Wilkinsburg, Pa.

Hugh Exton Steele, M.E., Testing Dept., Corn Products Mfg. Co., 42 E. Madison St., Chicago, Ill.

Lewis Buckley Stillwell, M.S. (Honorary), Consulting Eng'r, 100 Broadway, New York, N.Y.

Bruce Milton Swope, M.E., Draftsman, Pennsylvania Steel Co., Steelton, Pa. Res: 1121 Green St., Harrisburg, Pa.

Lewis Thomas, C.E., with Alexander Potter, Consulting Eng'r, 143 Liberty St., New York, N.Y. Res: 81 Columbia Heights, Brooklyn, N.Y.

Walter Atwood Thomas, E.M., 41 Oxford St., Worcester, Mass.

Samuel Harrison Tilghman, A.B. (St. Johns), C.E., with Vielé, Cooper & Blackwell, 49 Wall St., New York, N.Y., at Great Western Power Plant, Oroville, Cal.

George Washington LeRoy Travis, C.E., Asst. to Eng'r, Sewer Dept., Borough Hall, Long Island City, N.Y. Res: 276 Barclay St., Flushing, N.Y.

Edgar Raymond Treverton, E.E., Electrical Research, South Bethlehem, Pa. Res: 510 Seneca St.

Malcolm Henry Ulman, B.S. (in Chemistry), with Bethlehem Steel Co., South Bethlehem, Pa. Res: 518 Chestnut St.

Joseph Cole Utley, M.E., with Bessemer & Lake Erie R.R. Co., Greenville, Pa. Res: 69 Shenango St.

Rudolph Walter Vossberg, M.E., Bethlehem, Pa.

Joseph Temple Waddill, E.M., with New Jersey Zinc Co., Palmerton, Pa.

Raymond Wadsworth Walters, B.A., Reporter, *The Globe*, South Bethlehem, Pa. Res: 57 S. Main St., Bethlehem, Pa.

Ernest Benjamin Walton, C.E., of Wm. E. Walton & Son, Builders of Glenburnie-on-Lake-George, Glenburnie, Putnam, N.Y.

Ira Benjamin Wheeler, jr., M.E., Engineering Dept., Railway Steel Spring Co., 71 Broadway, New York, N.Y. Res: 28 Prince St., Elizabeth, N.J.

Chester Harvey Wilcox, C.E., Graduate Student, Yale School of Forestry, New Haven, Conn.

William Clyde Willard, C.E. (Cumberland Univ.), M.S., Transitman on Land Survey, New Castle, Pa.

Roy Beck Woodring, B.A., Student, Law Dept., Univ. of Pa., Philadelphia, Pa.

HONORARY DEGREES.

1906.

ROSSITER W. RAYMOND, Ph.D., LL.D. (Honorary), Mining Eng'r; Sec., American Institute of Mining Eng'rs, 29 W. 39th St., New York, N. Y.

1907.

ARTHUR ARTON HAMERSCHLAG, Sc.D. (Honorary), Director of the Carnegie Technical Schools, Schenley Park, Pittsburg, Pa.

LEWIS BUCKLEY STILLWELL M.S. (Honorary), Consulting Eng'r, 100 Broadway, New York, N. Y.

The number of graduates is 1707, degrees having been conferred as follows:

Upon graduates of the School of General Literature: B.A., 92; B.S., 26; Ph.B., 7; M.A., 17.

Upon graduates of the School of Technology: C.E., 576; M.E., 401; B.M., 19; B.S. (in Mining and Metallurgy), 114; B.S. (in Chemistry), 3; E.M., 131; E.E., 242; A.C., 132; B.S. (in Architecture), 16; Met.E., 12; El.Met., 9; Chem.E., 1; M.S., 18; Ph.D., 2.

Honorary degrees: LL.D., 1; Sc.D., 1; M.S., 1.

Of these 16 have taken the degree of B.A. and M.A.; 5 of B.S. and C.E.; 1 of B.A. and C.E.; 1 of B.S. and A.C.; 10 of B.M. and E.M.; 49 of B.S. and E.M.; 1 of B.S., B.M., and E.M.; 1 of B.M., E.M., and A.C.; 1 of B.S., E.M., and C.E.; 1 of C.E. and E.M.; 2 of A.C. and E.M.; 1 of C.E. and M.E.; 1 of M.E. and B.S.,; 1 of M.E. and E.E.; 1 of E.M. and E.E.; 3 of B.S. and M.S.; 4 of C.E. and M.S.; 1 of E.E. and M.S.; 1 of M.E. and M.S.; 1 of A.C. and M.S.; 1 of Met.E. and M.S.; 1 of B.S., E.M., and M.S.; 2 of A.C., M.S., and Ph.D. 1591 graduates are living.

ONE YEAR COURSE IN ELECTRICITY.

Beginning with the year 1884-85, the University offered a special course in Electricity, covering one year's work. Those who completed this course received certificates, but no degrees. In 1888, the full four-year course in Physics and Electrical Engineering, leading to the degree of E.E., was established, and the one-year course was withdrawn. The names of those who completed this course are not included in the Roll of Alumni, but are here given:

Elmer Ellsworth Boyer, '85, Electrical Supt., Lynn Works, General Electric Co., West Lynn, Mass. Res: 30 Endicott St.

Albert Brodhead, '88, Real Estate, Bethlehem, Pa. Res: 121 S. Centre St.

Edward Connor, '86, 2206 Locust St., Philadelphia, Pa.

William Fairchild Dean, '88, Mgr., Montreal Office, Canadian General Electric Co., 81 St. Peter St., Montreal, Canada.

Horace Musser Engle, '86, Economic Geologist, 414 Terry Bldg., Roanoke, Va. Res: 921 Commerce St., S. W.

Herman Frauenthal, '88, A.C., M.D., Physician and Surgeon, 214 E. 50th St., New York, N.Y.

Walter George Fuller, '87, Electrician, Brattleboro, Vt. Res: 3 Estey St.

John Wesley Hackney, '87, City Eng'r, 622 Bartlett Bldg., Atlantic City, N.J. Res: 141 St. Charles Pl.

James Arthur Heaton, '86.

Richard Otto Albert Heinrich, '88, Director, European Weston Electrical Instrument Co., S. 42, Ritterstrasse 88, Berlin, Germany.

William Hoopes, '86, Electrical Eng'r, Pittsburg Reduction Co., Pittsburg, Pa. Res: 6341 Walnut St.

Joseph Allison Horner, '88.

William Henry Hubbard, '88, Pres., Midland Metal Co.; Sec., Philadelphia Mutual Life Insurance Co., 12th Floor, North American Bldg., and 1427 Catharine St., Philadelphia, Pa.

Walter Eugene Hyer, '86, Hemet, Cal.

Daniel Henry Jenkins, '88, M.D., Physician, 1932 N. Main Ave., Scranton, Pa.

Charles Leavitt Jenness, '85, Pres., Avery & Jenness Co., 26 W. Randolph St., Chicago, Ill. Res: 6206 Madison Ave.

William Sigler Jones, '87, Sales Agt., Motor Car Specialty Co., 112 N. Broad St., Philadelphia, Pa. Res: 5144 Wayne Ave., Germantown, Pa.

George Hermann Koehler, '85.

Robert McAllister Lloyd, '86, Mgr., General Vehicle Co., Long Island City, N. Y.

Dion M. Martinez, jr., '87.

Charles Jacob Meade, '86.

John Jacob Miller, '88, Gen. Agt., New York Heat, Light & Power Co., 1 Madison Ave., New York, N. Y. Res: 18 W. 21st St.

James Leidy Moore, '88, Supt., Camden Dist., Electrical Dept., Public Service Corporation of New Jersey, 15th & Mickle Sts., Camden, N. J. Res: Moorestown, N. J.

George Harrison Neilson, '86, Gen. Mgr., Braeburn Steel Co., Braeburn, Pa. Res: Oakmont, Pa.

Horace Field Parshall, '87, Consulting Eng'r, 801 Salisbury House, London Wall, London, E. C., England.

George Herbert Putnam, '85, Principal, Educational Dept., Kansas School for the Deaf, Olathe, Kan.

Charles Norris Robinson, '88, with Securities Corporation, North American Bldg., Philadelphia, Pa. Res: Chelten Ave. W., Germantown, Pa.

Harry Meyer Seitzinger, '88, Consulting Electrical Eng'r, 136 Barney St., Wilkes-Barre, Pa. Res: 175 W. River St.

Arthur Douglas Spear, '87.

Lewis Buckley Stillwell, '85, M.S., Consulting Eng'r, 100 Broadway, New York, N. Y. Res: Lakewood, N. J.

Charles Wesley White, '88.

George Henry Wolle, '87, Supt., Bethlehem Electric Light Co.; Supt., Bethlehem & Nazareth Ry. Co., Bethlehem, Pa. Res: 906 Prospect Ave.

Hugh Carlyle Young, '88, Bank Clerk, Tioga County Savings & Trust Co., Wellsboro, Pa.

OFFICERS OF THE ALUMNI ASSOCIATION OF LEHIGH UNIVERSITY, 1907-1908.

President.

H. S. MINER, Gloucester City, N. J.

Vice-Presidents.

L. R. ZOLLINGER, Philadelphia, Pa.
E. G. GRACE, Bethlehem, Pa.

Archivist.

HOWARD ECKFELDT, South Bethlehem, Pa.

Secretary and Treasurer.

P. A. LAMBERT, Bethlehem, Pa.

Honorary Alumni Trustees.

J. A. JARDINE, Philadelphia, Pa.
(Term expires June, 1908.)

F. P. HOWE, Philadelphia, Pa.
(Term expires June, 1909.)

T. M. EYNON, Philadelphia, Pa.
(Term expires June, 1910.)

G. B. LINDERMAN, South Bethlehem, Pa.
(Term expires June, 1911.)

Executive Committee.

H. S. MINER, *Chairman.*

J. A. JARDINE,	L. R. ZOLLINGER.
F. P. HOWE,	E. G. GRACE.
T. M. EYNON,	H. ECKFELDT,
G. B. LINDERMAN,	P. A. LAMBERT.

ALPHABETICAL ALUMNI LIST.

A

L. B. Abbott, '00.
H. L. Adams, '98.
R. L. Adams, '03.
W. J. Adams, jr., '96.
C. L. Addison, '88.
W. D. Aiken, '07.
*S. R. Alder, '01.
C. E. Aldinger, '05.
G. F. Allen, '99.
W. H. Allen, '85.
*W. A. Allgaier, '94.
F. DuP. Ammen, '97.
W. J. Ammer, '07.
F. F. Amsden, '87.
H. F. Anders, '07.
J. W. Anderson, '89.
P. L. Anderson, '01.
W. C. Anderson, '94.
J. G. deAndrade, '01.
F. C. Angle, '76.
H. L. Arbenz, '95.
R. S. Archibald, '07.
F. A. Armstrong, '02.
*L. P. Ashmead, '70.
W. N. R. Ashmead, '92.
*G. W. B. Asmussen, '92.
G. H. Atkins, '93.
*P. Atkinson, '89.
H. J. Atticks, '93.
H. L. Auchmuty, '85.
M. B. Augur, '91.
W. S. Ayars, '96.
H. B. Ayers, '96.
A. D. Ayres, '96.
C. T. Ayres, '95.
G. Ayres, '89.

B

A. G. Bachman, '02.
C. L. Bachman, '07.
*E. K. Bachman, '83.
W. A. Bachman, '05.
A. D. Badgley, '96.
A. Q. Bailey, '98.
L. W. Bailey, '99.
G. Baily, '04.
T. C. J. Baily, jr., '90.
H. J. B. Baird, '97.
R. L. Baird, '92.
F. Baker, jr., '95.
G. M. Baker, '07.
*W. H. Baker, '73.
C. K. Baldwin, '95.
F. H. Baldwin, '96.
G. R. Baldwin, '88.
H. L. Baldwin, '07.
H. W. Baldwin, '96.
L. H. Baldwin, '97.
L. W. Baldwin, '96.
S. Baldwin, '96.
N. Z. Ball, '03.
J. Ballard, '98.
C. L. Banks, '88.
H. C. Banks, '93.
N. C. Banks, '93.
A. F. Bannon, jr., '95.
G. W. Barager, '00.
C. E. Barba, '01.
J. C. Barber, '95.
W. S. Barley, '05.
H. P. Barnard, '04.
R. P. Barnard, '89.
W. M. D. Barnes, '06.
*J. N. Barr, '71.
J. Barrell, '92.
R. W. Barrell, '87.
W. R. Barrett, '90.
A. Barrientos, '98.
D. M. Barry, '01.
G. P. Bartholomew, '96.
R. J. Bartholomew, '95.

F. R. Bartles, '96.
C. M. Barton, '97.
C. W. Barwis, '06.
*J. Y. Bassell, jr., '92.
J. N. Bastress, '92.
R. C. Bastress, '95.
A. H. Bates, '89.
*E. A. Bates, '88.
G. W. S. Baton, '94.
C. C. W. Bauder, '96.
C. G. Baumgartner, '04.
A. W. Bayard, '00.
F. Bayard, '96.
R. A. Bayard, '07.
H. G. Bayles, '04.
H. W. Beach, '95.
W. D. Beatty, '88.
J. M. Beaumont, '92.
J. L. Beaver, '04.
E. H. Beazell, '90.
R. C. Becerra, '99.
*C. J. Bechdolt, '75.
B. G. Beck, '00.
G. C. Beck, '03.
H. H. Beck, '96.
M. R. Beck, '06.
H. C. Becker, '07.
L. Becker, '04.
S. A. Becker, '03.
G. W. Beggs, '95.
I. I. Beinhower, '94.
E. T. Belden, '96.
F. B. Bell, '98.
H. L. Bell, '97.
*T. F. Bell, '00.
M. C. Benedict, '99.
W. C. Benedict, '06.
A. C. Bennett, '05.
J. F. Benson, '00.
B. C. Bentley, '05.
J. D. Berg, '05.
S. E. Berger, '89.
L. Bernstein, '04.
M. Bernstein, '96.
J. H. Best, '95.
J. W. Beyer, '07.
W. J. Bieber, '96.
W. R. Binkley, '97.
A. K. Birch, '99.
R. C. Bird, '04.
R. M. Bird, '02.
L. S. Birely, '06.
*T. W. Birney, '85.
H. D. Bishop, '98.
L. G. Bishop, '06.
G. P. Bland, '72.
E. M. Blehl, '95.
H. R. Blickle, '93.
D. W. Bliem, '96.
C. J. Bloss, '04.
L. F. Blume, '05.
W. W. Blunt, '92.
J. E. Boatrite, '91.
R. A. Boehringer, '05.
H. G. Bonner, '04.
A. Bonnot, '87.
H. A. Bonzano, '88.
G. R. Booth, '86.
B. F. Borhek, '97.
H. T. Borhek, '98.
R. J. Borhek, '00.
A. G. Borowsky, '04.
B. F. Bossert, '96.
J. H. Bower, '00.
C. S. Bowers, '97.
H. L. Bowers, '00.
W. Bowie, '95.
*H. L. Bowman, '85.
J. W. Boyd, '91.
W. I. Boyd, '93.
H. F. Boyer, '96.
C. H. Boynton, '89.
J. Boyt, '97.
F. E. Bradenbaugh, '99.

W. Bradford, '88.
W. B. Brady, '97.
W. Y. Brady, '92.
G. H. Brandes, '04.
E. E. Bratton, '96.
F. E. Bray, '93.
T. J. Bray, jr., '94.
R. S. Breinig, '86.
A. T. Brice, '00.
J. J. Brice, '00.
C. S. Bricker, '95.
W. Briggs, '83.
D. H. Brillhart, '06.
J. H. Brillhart, '04.
R. G. Brindle, '07.
L. C. Brink, '94.
R. B. Brinsmade, '95.
J. A. Brodhead, '07.
R. Brodhead, '70.
F. S. Bromer, '96.
P. L. Brooke, '07.
J. E. Brooks, '95.
A. L. Broomall, '06.
D. J. Broughal, '98.
Edward C. Brown, '04.
Eugene C. Brown, '95.
H. F. Brown, '98.
J. H. Brown, '86.
R. B. Brown, '94.
Walter Emerson Brown, '05.
Walter Everett Brown, '97.
W. H. Brown, '95.
W. T. Brown, '95.
W. S. Brownell, '03.
F. H. Browning, '05.
A. T. Bruegel, '88.
A. Bruner, '80.
*D. P. Bruner, '72.
W. L. Bruner, '04.
J. A. Buch, '06.
N. W. Buch, '01.
J. E. Bucher, '91.
M. J. Bucher, '96.
P. Bucher, '98.
C. A. Buck, '87.
J. M. Buckland, '99.
J. B. Buckley, '91.
J. C. Buckner, '87.
J. H. Budd, '95.
*J. L. Budd, '89.
E. D. Buel, '94.
C. W. Buell, '04.
C. Bull, '78.
O. M. Bump, '07.
C. C. Burgess, '95.
*J. W. Burke, '00.
H. M. Burkey, '06.
O. C. Burkhart, '88.
J. L. Burley, '94.
G. F. Burnett, '93.
T. Burns, '01.
C. N. Butler, '88.
H. A. Butler, '83.
W. R. Butler, '70.
C. E. Butz, '05.
G. W. Butz, '03.
G. A. Buvinger, '96.
M. L. Byers, '88.

C

J. T. Callaghan, jr., '95.
E. Campbell, '89.
H. F. Campbell, '04.
A. M. Cañadas, '75.
D. H .Canfield, '00.
T. L. Cannon, '03.
J. F. Capriles, '99.
A. Cardenas, '90.
J. B. Carlock, '07.
C. F. Carman, '99.
F. J. Carman, '89.
W. C. Carnell, '94.
A. B. Carpenter, '96.
W. T. Carpenter, '02.

C. F. Carrier, '03.
M. Carrington, '96.
T. F. Carroll, '94.
H. M. Carson, '89.
*J. DeW. Carson, '76.
C. M. Case, '92.
G. P. Case, '92.
G. F. Cassedy, '03.
W. D. Cassin, '06.
C. Castellanos, '03.
F. L. Castleman, '95.
S. LeR. Caum, '04.
G. E. Chamberlain, '93.
H. S. Chamberlain, '03.
M. Chamberlain, '00.
E. Chao, '91.
H. B. Chapman, '00.
N. Chapman, '05.
R. L. Charles, '07.
M. H. Chase, '06.
H. W. Chester, '89.
R. E. Chetwood, jr., '95.
D. H. Childs, '98.
S. W. Chiles, '97.
H. A. Church, '05.
T. H. Clagett, '97.
C. E. Clapp, '86.
D. B. Clark, '01.
J. J. Clark, '88.
A. H. Clauder, '04.
D. M. Clawson, '06.
R. B. Claxton, '73.
A. S. Clay, '05.
H. B. Cleaveland, '04.
F. L. Clerc, '71.
W. P. Cleveland, '90.
C. E. Clewell, '05.
A. S. Clift, '95.
C. P. Clingerman, '06.
P. Cloke, '05.
F. R. Coates, '90.
G. H. Cobb, '86.
P. L. Cobb, '92.
F. A. Coleman, '92.
W. W. Coleman, '95.
W. J. Collier, '95.
G. P. Connard, '88.
B. T. Converse, '99.
F. L. Cooke, '96.
H. V. Cooke, '83.
M. L. Cooke, '95.
R. G. Cooke, '84.
W. H. Cooke, '85.
W. S. Cope, '90.
*H. St.L. Coppée, '72.
C. W. Corbin, '89.
*J. H. H. Corbin, '69.
J. C. Cornelius, '89.
W. A. Cornelius, '89.
B. A. Cornwell, '04.
D. Corsa, '05.
J. J. Cort, '03.
S. J. Cort, '06.
M. B. Cory, '04.
J. F. Cottrell, '06.
G. C. Coutant, '00.
C. E. Coxe, '90.
E. H. Coxe, '91.
*J. H. Crane, '01.
W. S. Cranz, '81.
H. M. Crawford, '95.
W. W. Crawford, '07.
H. M. S. Cressman, '95.
W. F. Cressman, '93.
W. Cresson, '91.
A. P. Crilly, '81.
*F. J. Crilly, '83.
J. P. Croll, '99.
J. S. Crowther, jr., '06.
L. Cuesta, '04.
R. E. Cullen, '07.
J. B. Cullum, '90.
B. A. Cunningham, '87.
E. S. Cunningham, '96.

J. A. Cunningham, '02.
J. S. Cunningham, '79.
A. W. Cupitt, '06.
B. O. Curtis, '97.
C. S. Curtis, '03.
S. P. Curtis, '96.
S. D. Cushing, '92.

D

F. A. Daboll, '96.
H. M. Daggett, '98.
J. W. Dalman, '96.
F. W. Dalrymple, '83.
J. M. Daniel, jr., '02.
C. M. Daniels, '07.
R. Daniels, '88.
H. B. Daugherty, '06.
G. Davies, '98.
A. A. Davis, '07.
G. H. Davis, '88.
H. H. Davis, '92.
J. R. Davis, '91.
M. Davis, jr., '92.
W. R. Davis, '92.
W. S. Davis, '88.
D. K. Dean, '06.
W. H. Dean, '86.
C. H. Deans, '89.
W. L. DeBaufre, '07.
W. J. Dech, '93.
H. S. Deck, '95.
P. A. Degener, '03.
R. Degener, '99.
*F. R. C. Degenhart, '72.
W. A. Dehm, '98.
A. S. DeHuff, '07.
H. DeHuff, '95.
J. W. DeMoyer, '90.
C. M. Denise, '98.
C. Denlinger, '06.
H. Denman, '92.
H. C. Dent, '06.
J. A. Dent, '05.
H. D. Desh, '07.
S. M. Dessauer, '96.
*C. H. Detwiler, '90.
P. H. DeWitt, '88.
S. C. DeWitt, '95.
J. C. Dick, '95.
W. C. Dickerman, '96.
C. E. Dickerson, '89.
E. Diebitsch, '89.
A. A. Diefenderfer, '02.
A. J. Diefenderfer, '03.
H. C. Dilliard, '00.
P. E. Dinan, '97.
J. C. Distler, '06.
A. B. Diven, '94.
E. Diven, '87.
L. Diven, '97.
S. E. Doak, '07.
E. Dodge, '92.
A. C. Dodson, '00.
T. M. Dodson, '00.
M. V. Domenech, '88.
T. J. Donahue, '83.
F. Donaldson, '01.
A. Doolittle, '87.
E. Doolittle, '91.
A. L. Dornin, '04.
C. Dorrance, '07.
J. W. Dougherty, '89.
C. M. Douglas, '93.
H. B. Douglas, '84.
W. J. Douglas, '94.
J. N. Downey, '02.
B. I. Drake, '97.
W. T. Drake, '00.
W. A. Draper, '07.
F. R. Dravo, '87.
G. P. Dravo, '88.
R. M. Dravo, '89.
P. Drayton, '92.
H. S. Drinker, '71.

E. A. Droll, '05.
R. S. Drummond, '06.
B. DuBarry, jr., '95.
G. F. Duck, '83.
F. O. Dufour, '96.
W. E. Dunbar, '04.
M. M. Duncan, '80.
G. A. Dunn, '07.
C. G. Dunnells, '97.
W. S. Dunscomb, '94.
C. H. Durfee, '93.
E. M. Durham, jr., '96.
E. H. Dutcher, jr., '96.
E. H. DuVivier, '89.
H. P. Dyson, '07.

E

J. Eagley, '77.
C. L. Eastman, '07.
A. Eavenson, '91.
*H. S. Eckert, '92.
N. Eckert, '00.
H. Eckfeldt, '95.
J. J. Eckfeldt, '98.
A. W. A. Eden, '95.
T. S. Eden, '96.
A. Edgar, '05.
L. E. Edgar, '98.
H. E. Edmonds, '04.
R. S. Edmondson, '06.
E. D. Edmonston, '98.
W. N. Edson, '85.
W. A. Ehlers, '01.
E. R. Eichner, '02.
H. F. Eigenbrodt, '06.
H. W. Eisenhart, '03.
S. R. Elliott, '97.
T. P. Elmore, '94.
L. H. Ely, '92.
N. M. Emery, '99.
L. O. Emmerich, '82.
T. G. Empie, '94.
G. W. Engel, '92.
*J. R. Engelbert, '85.
G. P. Enke, '05.
B. Enright, '93.
G. R. Enscoe, '96.
C. Enzian, '01.
J. de la C. Escobar, '91.
W. L. Estes, jr., '05.
C. Evans, jr., '01.
H. B. Evans, '93.
L. W. Evans, '03.
M. deB. Evans, '06.
W. A. Evans, '96.
T. M. Eynon, '81.

F

*E. L. Faison, jr., '95.
A. J. Farabaugh, '04.
L. E. Farabaugh, '04.
M. M. Farley, '06.
G. H. Farman, '95.
R. Farnham, jr., '99.
J. H. Farrell, '07.
*W. D. Farwell, '89.
A. J. Fasenmyer, '07.
E. F. Fassitt, '71.
F. Faust, '94.
T. G. Fear, '06.
M. H. Fehnel, '87.
S. P. Felix, '03.
J. DuB. Ferguson, '94.
C. V. Ferriday, '96.
E. C. Ferriday, '95.
R. Ferriday, '94.
W. Ferris, '95.
C. E. Fink, '90.
F. W. Fink, '86.
A. A. Finkh, '97.
*F. E. Fisher, '90.
F. R. Fisher, '90.
H. S. Fisher, '87.
J. W. Fisher, '04.

W. W. Fitch, '04.
S. H. Fleming, '05.
*J. W. Fletcher, '00.
C. B. Flory, '96.
J. H. Flory, '01.
R. D. Floyd, '94.
C. W. Focht, '88.
H. A. Foering, '90.
W. B. Foote, '84.
J. H. Ford, '06.
A. E. Forstall, '83.
W. Forstall, '91.
E. S. Foster, '07.
C. R. Fountain, '96.
J. M. Fouse, '05.
G. E. Fox, '07.
S. R. Fraim, '03.
E. Franco, '01.
J. J. Frank, '94.
G. S. Franklin, '88.
H. W. Frauenthal, '89.
A. H. Frazier, '89.
K. Frazier, '87.
C. J. Frederici, '04.
*T. W. Frederick, '76.
I. J. Freedman, '07.
R. McN. Freeman, '00.
S. W. Frescoln, '88.
L. A. Freudenberger, '01.
F. Freyhold, '85.
A. Frick, '03.
E. R. Frisby, '98.
G. H. Frost, '93.
H. LeR. Fryer, '02.
F. P. Fuller, '93.
J. Fuller, '00.
W. B. Fuller, '98.
I. D. Fulmer, '97.
N. E. Funk, '05.

G

*G. L. Gabrio, '95.
L. L. Gadd, '94.
R. F. Gadd, '93.
A. G. Galan, '95.
J. M. G. Galán, '98.
C. Gallardo, '02.
F. M. Gallardo, '97.
J. G. Gandia, '99.
T. J. Gannon, '96.
T. K. R. Gardner, '03.
M. W. Garman, '01.
L. R. Garrison, '04.
H. M. Gassman, '01.
L. P. Gaston, '88.
W. Gates, jr., '88.
A. W. Gaumer, '06.
J. T. Gavan, '02.
J. N. Gawthrop, jr., '05.
R. E. S. Geare, '04.
C. W. Gearhart, '93.
F. B. Gearhart, '01.
W. B. Geiser, '02.
R. E. L. George, '98.
P. Gerhard, '03.
W. D. Gernet, '03.
E. A. Giberga y Galé, '95.
J. J. Gibson, '95.
P. D. Giess, '77.
*J. E. Gilbert, '78.
A. H. Gill, '00.
T. B. Gilliam, '05.
A. S. Gilmore, '03.
C. F. Gilmore, '06.
R. J. Gilmore, '07.
L. T. Girdler, '03.
T. M. Girdler, '01.
J. B. Given, '96.
T. Gjertsen, '92.
F. W. Glading, '94.
A. R. Glancy, '03.
*A. M. Glassel, '77.
P. W. Gleason, '02.
*J. B. Glover, jr., '88.
E. G. Godshalk, '95.

H. H. Godshall, '93.
R. S. Goerlich, '05.
E. F. Gohl, '07.
S. W. Goldschmidt, '03.
N. O. Goldsmith, '83.
F. Golian, '02.
O. S. Good, '97.
R. Goodman, '90.
W. T. Goodnow, '83.
G. K. Goodwin, '04.
W. R. Goss, '95.
T. L. Gossling, '06.
E. T. Gott, '06.
R. T. Gotwald, '86.
J. J. Grabbe, '04.
E. G. Grace, '99.
J. W. Grace, jr., '99.
C. A. Gradwohl, '02.
W. H. Grady, '06.
*J. S. Graff, '96.
M. B. Graff, '94.
W. W. Graff, '01.
C. B. Graham, '03.
S. L. Graham, '93.
F. L. Grammer, '89.
W. Gratz, '98.
C. W. Gray, '81.
R. J. Green, '07.
A. E. Greene, '06.
G. E. Greene, '90.
H. T. Greene, '00.
M. J. Greenough, '07.
J. H. C. Gregg, '06.
W. Griffith, '76.
J. S. Griggs, jr., '91.
W. H. Grimball, '06.
E. A. Grissinger, '94.
R. S. Griswold, '97.
H. J. Groeninger, '07.
F. A. Groff, '00.
C. A. Gross, '07.
C. F. Gross, '00.
R. F. Gross, '02.
L. J. H. Grossart, '86.
*W. H. Groverman, '96.
P. L. Grubb, '01.
W. B. Grubbe, '00.
A. B. Grubmeyer, '07.
*J. A. Gruver, '92.
R. S. S. Guerber, '06.
W. Gummere, '99.
F. H. Gonsolus, '98.
B. Guthrie, '94.

H

W. H. Haas, '01.
M. S. Hachita, '02.
C. B. Hagy, '06.
C. W. Haines, '74.
F. T. Haines, '95.
*H. S. Haines, '87.
J. F. Halbach, '75.
B. F. Haldeman, '81.
D. Hall, '96.
W. McC. Hall, '94.
W. R. Hall, '02.
O. J. Haller, '04.
F. D. Hallock, '94.
A. A. Hamerschlag, '07.
T. G. Hamilton, '95.
M. S. Hanauer, '86.
W. T. Hanly, '97.
W. S. Hanna, '02.
*O. C. Hannum, '99.
A. B. Hanscom, '00.
J. F. Hanst, '07.
H. Hardcastle, '88.
T. H. Hardcastle, '80.
Y. F. Hardcastle, '06.
W. G. Hare, '98.
S. T. Harleman, '01.
H. W. Harley, '90.
H. T. Harper, '84.
E. S. Harrar, '01.

G. W. Harris, '89.
L. S. Harris, '93.
N. C. Harrison, '05.
R. A. Harrower, '05.
G. A. Hart, '88.
W. D. Hartshorne, '74.
H. J. Hartzog, '04.
R. R. Harvey, '95.
S. J. Harwi, '86.
*F. A. Hausman, '01.
C. D. Hayes, '05.
E. P. Hayes, '06.
F. E. Hayes, jr., '07.
G. S. Hayes, '91.
C. S. Haynes, '93.
H. W. Haynes, '03.
R. Hazel, '98.
S. C. Hazleton, '86.
W. C. Hazlett, '78.
R. W. Heard, '93.
D. G. Hearne, '90.
N. H. Heck, '03.
R. C. H. Heck, '93.
J. S. Hegeman, '02.
I. A. Heikes, '85.
J. S. Heilig, '91.
W. L. Heim, '02.
W. A. Heindle, '91.
J. G. Heinz, '00.
G. M. Heller, '77.
L. Henderson, '89.
W. H. Henderson, '05.
W. H. Hendricks, '06.
F. A. Henry, '06.
T. L. Henry, '95.
A. W. Henshaw, '94.
C. S. Heritage, '04.
P. H. Herman, '06.
A. A. Herr, '74.
H. N. Herr, '96.
R. L. Herrick, '04.
J. F. Hersh, '91.
H. B. Hershey, '98.
J. W. Hertzler, '03.
G. K. Herzog, '07.
H. D. Hess, '96.
H. H. Hess, '98.
*H. S. Hess, '95.
A. W. Hesse, '07.
A. Y. Hesse, '94.
C. E. Hesse, '89.
H. V. Hesse, '91.
F. Hewett, '02.
W. S. Hiester, '97.
I. M. Higbee, '95.
E. Higgins, jr., '02.
H. H. Hillegas, '84.
F. H. Hilliard, '94.
E. D. Hillman, '98.
*C. F. Hinkle, jr., '03.
J. B. Hirst, '04.
W. J. Hiss, jr., '95.
J. B. Hittell, '87.
S. H. Hodges, '04.
R. G. Hodgkin, '05.
H. W. Hoeke, '05.
J. D. Hoffman, '83.
E. F. Hofford, '84.
W. E. Holcombe, '94.
A. D. Hollingsworth, '00.
*J. S. B. Hollinshead, '90.
M. H. Holz, '94.
M. J. Honan, '00.
P. D. Honeyman, '91.
R. B. Honeyman, '88.
G. G. Hood, '83.
R. N. Hood, '97.
R. A. Hooke, '07.
J. T. Hoover, '91.
C. C. Hopkins, '82.
W. Hopkins, '95.
G. L. Hoppes, '83.
H. J. Horn, '98.
F. R. Horne, '07.

G. A. Horne, '99.
L. S. Horner, '98.
R. R. Horner, '99.
E. B. Hostetter, '05.
H. S. Houskeeper, '72.
*F. K. Houston, '90.
J. M. Howard, '87.
O. Z. Howard, '07.
F. P. Howe, '78.
M. A. DeW. Howe, '86.
R. P. Howell, '96.
A. A. Howitz, '94.
C. W. Hudson, '89.
E. M. Huggins, '00.
E. P. Hulse, '07.
*J. E. Humphreys, '06.
G. W. Hunsicker, '94.
R. Hunt, '03.
F. G. Hurst, '07.
A. C. Hutchinson, '02.
G. C. Hutchinson, '94.
R. P. Hutchinson, '04.

I

H. Ichiwaka, '91.
*D. W. Irvine, '95.
H. T. Irwin, '97.
J. G. H. Isert, '05.

J

G. R. Jackson, '99.
H. L. Jackson, '04.
W. S. Jackson, '96.
G. G. Jacobosky, '07.
C. B. Jacobs, '95.
C. A. Jacoby, '06.
E. A. Jacoby, '95.
H. S. Jacoby, '77.
W. L. Jacoby, '92.
J. R. James, '06.
W. A. James, '95.
D. W. Jardine, '07.
J. A. Jardine, '84.
H. S. Jaudon, '95.
W. H. Jaxheimer, '02.
F. W. Jefferson, '06.
S. H. Jencks, '88.
*G. A. Jenkins, '70.
A. P. Jenks, '97.
A. B. Jessup, '95.
*A. E. Jessup, '92.
J. T. Jeter, '80.
J. J. Jiminez, '92.
E. B. John, '95.
W. S. Johns, jr., '02.
A. T. Johnson, '99.
E. F. Johnson, '07.
E. M. Johnson, '05.
H. S. Johnson, '97.
R. G. Johnson, '04.
V. A. Johnson, '96.
A. Johnston, '89.
E. E. Johnston, '06.
A. B. Jones, '94.
B. H. Jones, '94.
C. C. Jones, '87.
H. H. Jones, '97.
J. T. Jones, '05.
M. D. Jones, '05.
R. H. Jones, '07.
H. E. Jordan, '03.
W. R. Jordan, '03.
A. E. Juhler, '91.
E. P. Jump, '01.
C. A. Junken, '86.

K

A. S. Kapella, '95.
D. Kautz, '95.
R. C. Kautz, '05.
R. D. Kavanaugh, '04.
W. H. Kavanaugh, '94.
M. A. Keck, '04.
W. B. Keim, '95.

C. L. Keller, '93.
J. S. Kellogg, jr., '89.
J. W. Kellogg, '84.
H. Kemmerling, '91.
C. E. Kendig, '02.
F. U. Kennedy, '07.
B. M. Kent, '04.
G. E. Kent, '07.
J. M. S. Kerlin, '89.
D. G. Kerr, '84.
W. J. Kerr, '70.
E. A. Keys, '99.
H. E. Kiefer, '92.
W. F. Kiesel, jr., '87.
R. Kimball, '99.
C. F. King, '80.
E. G. King, '07.
R. W. Kinsey, '07.
H. E. Kip, '95.
M. D. Kirk, '06.
R. G. Kirk, '05.
R. R. Kitchel, '92.
J. W. Kittrell, '87.
A. W. Klein, '99.
J. H. Klinck, '99.
V. W. Kline, '96.
W. C. Kline, '05.
*L. E. Klotz, '72.
H. M. Knapp, '91.
F. N. Kneas, '98.
R. W. Knight, '94.
F. H. Knorr, '87.
S. B. Knox, '93.
H. O. Koch, '05.
B. G. Kodjbanoff, '98.
J. deB. Kops, '83.
J. B. Krause, '98.
L. G. Krause, '01.
P. T. Krause, '04.
R. E. Kresge, '96.
C. T. Kriebel, '07.
W. V. Kulp, '90.
H. M. Kurtz, '90.
M. H. Kuryla, '05.

L

S. W. Labrot, '92.
T. N. Lacey, '06.
D. H. Lackey, '95.
R. L. Lafferrander, '07.
N. Lafon, '78.
P. A. Lambert, '83.
S. E. Lambert, '89.
W. A. Lambert, '95.
O. M. Lance, '72.
H. K. Landis, '90.
W. S. Landis, '02.
R. S. Landron, '99.
C. A. Langdon, '94.
*S. D. Langdon, '87.
F. B. Langston, '84.
W. Langston, '84.
L. E. Lannan, '95.
G. L. de Lara, '86.
R. E. Laramy, '96.
W. H. Larkin, jr., '05.
W. A. Lathrop, '75.
S. T. Laubach, '01.
A. R. Laubenstein, '01.
F. C. Lauderburn, '91.
H. H. Lauer, '06.
E. H. Lawall, '82.
J. P. S. Lawrance, '73.
T. H. Lawrence, '98.
A. W. Lawson, '07.
H. Q. Layman, '05.
J. W. Ledoux, '87.
H. R. Lee, '06.
L. R. Lee, '97.
H. Lefevre, '92.
J. E. Leibfried, '00.
G. C. Leidy, '00.
J. F. Leonard, '05.
H. D. Leopold, '94.

C. McK. Leoser, '91.
T. S. Leoser, '90.
T. M. Lesher, '07.
W. H. Lesser, '05.
W. G. Lessig, '00.
A. E. Lewis, jr., '88.
A. H. Lewis, '95.
G. Lewis, '95.
G. M. Lewis, '03.
H. S. Lewis, '00.
T. Lewis, '97.
J. J. Lincoln, '89.
G. B. Linderman, '87.
*R. P. Linderman, '84.
J. B. Lindsey, jr., '98.
F. F. Lines, '02.
W. A. Linn, '04.
A. E. Lister, '92.
J. E. Litch, '90.
F. J. Littell, '99.
J. E. Little, '94.
C. V. Livingston, '97.
W. J. Lloyd, '92.
J. Lockett, '89.
B. W. Loeb, '95.
F. S. Loeb, '93.
A. Long, '89.
A. F. Loomis, '97.
B. E. Loomis, '96.
C. A. Loomis, '98.
J. T. Loomis, '92.
J. G. Loose, '07.
C. G. Lord, '03.
C. W. Lord, '96.
C. W. Lotz, '06.
C. M. Loucks, '07.
T. P. Lovering, '95.
M. J. Luch, '02.
C. A. Luckenbach, '86.
*C. O. Luckenbach, '94.
O. F. Luckenbach, '01.
C. W. Lüders, '04.
T. H. Lüders, '06.
T. W. Lukens, '00.
C. E. T. Lull, '00.
W. A. Lydon, '86.
W. H. Lynch, jr., '05.

M

C. S. MacCalla, '96.
W. T. MacCart, '04.
W. H. MacCarthy, '71.
W. C. MacFarlane, '04.
O. G. MacKnight, '99.
R. MacMinn, '07.
B. MacNutt, '97.
J. B. McBride, '96.
W. T. McCarthy, '00.
H. D. McCaskey, '93.
L. G. McCauley, '04.
J. McCleary, jr., '04.
H. H. McClintic, '88.
*M. McClung, jr., '94.
J. A. McClurg, '91.
K. W. McComas, '00.
F. J. McDevitt, '04.
W. A. McFarland, '88.
C. J. McGonigle, '01.
G. K. McGunnegle, '99.
H. L. McIlvain, '88.
H. A. McIntosh, '07.
R. A. McKee, '95.
C. L. McKenzie, '93.
F. A. McKenzie, '95.
*S. T. McKenzie, '95.
R. S. McMullen, '06.
E. M. McNally, '07.
G. P. McNiff, '06.
J. D. McPherson, '94.
P. O. McQueen, '07.
J. McVey, '02.
J. T. McVey, '06.
*W. G. McVey, '00.
C. W. Macfarlane, '76.

E. M. Mack, '04.
J. S. Mack, '88.
R. U. P. Mackall, '07.
C. E. Maeder, '00.
R. W. Mahon, '76.
J. J. deG. Malcher, '76.
H. L. Manley, '92.
P. D. March, '06.
C. E. Marks, '03.
W. P. Marr, '93.
C. D. Marshall, '88.
H. C. Marshall, '06.
L. H. Marshall, '98.
J. F. Marsteller, '77.
J. VanS. Martenis, '94.
J. J. Martin, '89.
J. P. Martin, '00.
W. Martin, '05.
C. E. Martinez, '01.
J. G. Mason, '97.
N. P. Massey, '95.
C. M. Masson, '99.
R. S. Masson, '92.
V. E. Masson, '96.
J. O. Mathewson, '94.
D. A. Maurer, '06.
A. S. Maurice, '93.
C. F. Maurice, '95.
G. H. Maurice, '93.
T. A. H. Mawhinney, '06.
A. J. Mayer, '07.
A. E. Meaker, '75.
W. L. Meaker, '99.
J. A. Mease, '05.
W. A. Megraw, '97.
H. S. Meily, '87.
J. M. Mendoza, '06.
L. D. Menough, '01.
L. Mercader, '06.
E. A. Mercenario, '97.
R. A. Mercur, jr., '07.
*J. F. Merkle, '84.
F. A. Merrick, '91.
*W. S. Merrill, '94.
N. N. Merriman, '05.
R. M. Merriman, '06.
T. Merriman, '97.
*T. Merritt, '74.
G. S. Mervine, '05.
W. R. Meyers, '07.
T. B. Mickley, '05.
J. F. Middledith, '99.
E. McC. Milheim, '02.
E. J. Millar, '92.
Charles Henry Miller, '88.
*Charles Henry Miller, '89.
Charles Herbert Miller, '90.
E. F. Miller, '83.
E. T. Miller, '03.
E. W. Miller, '96.
G. P. Miller, '88.
J. E. Miller, '93.
J. M. Miller, '04.
J. S. Miller, '95.
J. Z. Miller, '91.
W. H. Miller, '94.
*J. H. Millholland, '88.
P. D. Millholland, '86.
K. Mills, '06.
H. S. Miner, '88.
H. B. de Miranda, '73.
R. F. de Miranda, '72.
*S. Miyahara, '77.
C. L. Moffatt, '04.
C. W. Moffett, '89.
A. W. Moore, '06.
C. A. Moore, '94.
H. J. Moore, '01.
L. A. Moore, '07.
L. D. Moore, '07.
M. de la Mora, '00.
R. de la Mora, '96.
W. F. More, '83.
C. H. Morgan, '96.

E. R. Morgan, '03.
J. F. Morgan, '99.
T. A. Morgan, '04.
W. L. Morgan, '02.
*C. F. Moritz, '98.
A. D. Morris, '95.
H. T. Morris, '91.
R. H. Morris, jr., '89.
S. R. Morris, '07.
W. E. Morris, '89.
J. M. Morrison, '75.
G. R. Morrow, '00.
H. S. Morrow, '88.
J. A. Morrow, '87.
J. T. Morrow, '89.
N. Morrow, '83.
R. T. Morrow, '82.
C. R. Morss, '04.
L. M. Morss, '04.
C. T. Mosman, '92.
D. L. Mott, '88.
F. D. Mount, '97.
E. T. Murphy, '01.
H. M. P. Murphy, '04.
A. F. Murray, '05.
C. E. P. Murray, '02.
W. S. Murray, '95.
W. H. Mussey, '96.
W. U. Mussina, '04.
H. K. Myers, '84.
J. H. Myers, '96.
L. B. Myers, '07.
W. H. Myers, '03.
W. F. Mylander, '93.

N

C. P. Nachod, '97.
G. Nauman, jr., '90.
W. L. Neill, '88.
*R. Neilson, '95.
H. S. Neiman, '88.
J. L. Neufeld, '94.
C. W. F. Neuffer, '94.
R. E. Neumeyer, '90.
C. A. Newbaker, '94.
C. G. Newton, '99.
H. H. Newton, '97.
D. K. Nicholson, '85.
T. Nicholson, '83.
W. E. Nicholson, '07.
*H. B. C. Nitze, '87.
R. C. Noerr, '97.
J. J. Nolan, '01.
B. B. Nostrand, jr., '78.
A. R. Nuncio, '84.

O

*J. A. deObaldia, '98.
A. D. Oberly, '89.
F. Oberly, '96.
R. L. Ogden, '94.
J. F. O'Hearn, '94.
C. H. Ohlwiler, '05.
W. R. Okeson, '96.
C. L. Olmstead, '93.
L. A. Olney, '96.
*R. B. Olney, '92.
A. E. Olpp, '03.
J. M. O'Malley, '89.
C. J. O'Neill, '93.
G. Ordway, '94.
J. O'Reilly, '98.
C. L. Orth, '04.
H. Orth, jr., '92.
L. Ortner, '00.
N. M. Osborne, jr., '93.
R. E. Ozias, '92.

P

J. W. Packard, '84.
D. J. Packer, '04.
*H. E. Packer, '70.
H. C. Paddock, '98.
*J. H. Paddock, '79.

P. M. Paine, '91.
*H. Palmer, '88.
H. L. Palmer, '96.
*H. R. Palmer, '99.
M. P. Paret, '78.
C. J. Parker, '88.
C. W. Parkhurst, '93.
A. R. Parsons, '00.
F. W. Parsons, '02.
D. W. Patterson, '93.
G. S. Patterson, '83.
E. L. Pattison, '07.
F. J. Payne, '03.
W. A. Payne, '94.
R. R. Peale, '83.
E. C. Pearson, '03.
E. J. Peck, '01.
*H. R. Peck, '97.
J. G. Peck, '93.
F. S. Pecke, '75.
C. R. Peebles, '04.
J. F. Pelly, '04.
J. H. Pennington, '97.
N. R. Pennypacker, '07.
H. L. Pentz, '05.
W. C. Perkins, '90.
F. A. Perley, '98.
R. S. Perry, '88.
[illegible] M. Person, '05.
*F. B. Petersen, '85.
J. G. Petrikin, '96.
G. F. Pettinos, '87.
J. R. Pettit, '99.
M. V. Pettit, '94.
H. W. Pfahler, '04.
E. V. Phelps, '05.
J. H. Philips, '95.
A. E. Phillips, '90.
*J. Phillips, jr., '95.
R. H. Phillips, '87.
H. S. Pierce, '04.
F. W. B. Pile, '88.
C. Platt, '90.
J. S. Polhemus, '72.
R. K. Polk, '87.
C. P. Pollak, '87.
W. C. Pollitt, '04.
M. W. Pool, '96.
H. F. J. Porter, '78.
J. I. Porter, '07.
R. H. E. Porter, '89.
R. S. Porter, '07.
H. A. Porterfield, '83.
A. Potter, '90.
G. E. Potter, '80.
S. C. Potts, '94.
J. L. Poultney, '95.
J. H. Powell, '04.
N. S. Powell, '00.
E. W. Pratt, '90.
M. D. Pratt, '87.
H. J. Prechtl, '07.
H. R. Price, '70.
J. B. Price, '85.
E. J. Prindle, '90.
H. W. Protzeller, '05.
F. H. Purnell, '83.
M. H. Putnam, '97.
F. R. Pyne, '06.

Q

W. A. Quadenfield, '07.
C. W. Quarrier, '98.
E. A. Quier, '91.
H. C. Quigley, '95.

R

L. T. Rainey, '99.
A. C. Ramsay, '07.
F. DeW. Randolph, '92.
R. B. F. Randolph, '93.
W. K. Randolph, '78.
*J. L. Rankin, '96.
R. S. Rathbun, '92.
A. G. Rau, '88.

C. R. Rauch, '77.
R. W. Raymond, '06.
C. E. Raynor, '88.
R. H. Read, '78.
J. J. Reamer, '00.
V. C. Records, '98.
H. B. Reed, '70.
*H. P. Reed, '96.
Percy Lawrence Reed, '98.
Percy Leslie Reed, '99.
G. K. Reel, '07.
*W. M. Rees, '74.
A. K. Reese, '89.
J. N. Reese, '00.
*A. S. Reeves, '84.
H. A. Reid, '96.
J. G. Reid, '93.
V. H. Reid, '99.
J. R. Reigart, '03.
W. Reincke, jr., '95.
E. T. Reisler, '87.
H. G. Reist, '86.
R. B. Rench, '06.
W. F. Rench, '91.
R. R. Renner, '06.
H. P. Reno, '04.
J. W. Reno, '83.
E. C. Reynolds, '93.
J. B. Reynolds, '07.
J. P. Reynolds, jr., '97.
S. A. Rhodes, '92.
W. P. Rice, '76.
E. L. Rich, '05.
F. E. Richards, '93.
G. T. Richards, '87.
H. Richards, '76.
J. W. Richards, '86.
L. W. Richards, '76.
W. P. Richards, '88.
*G. M. Richardson, '86.
O. Rickert, '88.
E. Ricksecker, '82.
W. C. Riddick, '90.
B. DeW. Riegel, '98.
J. I. Riegel, '92.
J. S. Riegel, '90.
S. S. Riegel, '97.
E. J. Rights, '95.
H. T. Rights, '95.
G. W. Ritchey, '93.
S. N. Riter, '95.
N. B. Robbinovitz, '03.
W. F. Roberts, '02.
W. H. Roberts, '06.
G. L. Robinson, '03.
*M. Rock, '69.
T. C. Roderick, '94.
W. H. Rodney, '01.
F. W. Roebling, jr., '01.
*A. L. Rogers, '89.
C. L. Rogers, '83.
J. D. Rogers, '03.
F. W. Roller, '94.
C. E. Ronaldson, '69.
*W. D. Ronaldson, '70.
B. T. Root, '06.
D'A. W. Roper, '98.
P. R. Roper, '07.
*A. S. Ross, '86.
J. G. Ross, '00.
C. K. Roulston, '07.
E. P. Roundey, '97.
*G. Rovelo, '99.
C. E. Rowe, '00.
J. T. Rowe, '07.
H. W. Rowley, '85.
*C. W. Royce, '97.
*G. A. Ruddle, '86.
J. Ruddle, '83.
J. A. Ruddy, '05.
J. D. Ruff, '82.
C. L'H. Ruggles, '03.
G. H. Ruggles, '96.
C. B. Rutter, '94.

C. C. Rutter, '96.
F. C. Ryan, '05.
J. C. Ryan, '01.
C. E. Ryder, '05.

S

D. M. Sachs, jr., '02.
F. B. Sage, '93.
M. T. Saldaña, '07.
S. H. Salisbury, jr., '06.
A. L. Saltzman, '97.
J. E. Sanborn, '90.
A. Sanchez, '00.
A. J. Sanchez, '01.
R. F. Sanchez, '98.
C. F. Sanders, '97.
J. C. Sandorf, '07.
F. W. Sargent, '79.
E. T. Satchell, '00.
W. R. Sattler, '88.
V. Saucedo, '03.
*M. L. Saulsbury, '93.
A. C. Savidge, '01.
W. H. Sayre, jr., '86.
J. R. Scarlett, '07.
G. H. Schaeffer, '05.
J. A. Schloss, '93.
F. R. Schmid, '03.
M. H. Schmid, '07.
E. H. Schmidt, '05.
R. Schmitz, '91.
E. A. Schnabel, '91.
T. G. Schnabel, '07.
W. R. Schnabel, '05.
A. Schneider, '92.
H. Schneider, '94.
B. F. Schomberg, '94.
C. M. Schoonover, '06.
A. Schotte, '93.
C. W. Schwartz, jr., '89.
C. T. Schwarze, '05.
H. C. Schwecke, '98.
A. deSchweinitz, '05.
E. Schweitzer, '07.
*E. Schwinghammer, '95.
C. F. Scott, '97.
J. D. Scott, '07.
H. H. Scovil, '00.
H. D. Scudder, '72.
W. McI. Scudder, '73.
*J. W. Scull, '87.
H. H. Seabrook, '97.
J. A. Seacrest, '05.
B. Searle, '84.
H. S. Seipt, '05.
H. K. Seltzer, '95.
W. F. Semper, '93.
J. B. Semple, '92.
L. B. Semple, '84.
S. P. Senior, '97.
A. H. Serrell, '97.
J. C. Sesser, '96.
E. E. Seyfert, '94.
S. S. Seyfert, '04.
J. W. Shaeffer, '01.
C. A. Shaffer, '05.
E. F. Shaffer, '07.
*W. Shapleigh, '71.
A. B. Sharp, '93.
F. B. Sheaffer, '97.
C. K. Shelby, '92.
L. R. Shellenberger, '91.
J. Shema, '05.
G. H. Shenberger, '05.
*A. Y. Shepherd, '96.
G. E. Shepherd, '94.
D. F. B. Shepp, '98.
J. L. Sheppard, jr., '97.
H. J. Sherman, '90.
J. E. Shero, '95.
A. A. Shimer, '99.
I. A. Shimer, '91.
C. E. Shipley, '94.
E. H. Shipman, '88.

S. S. Shive, '04.
W. R. Shively, '04.
W. C. Shoemaker, '90.
D. N. Showalter, '06.
L. D. Showalter, '96.
H. Shriver, '96.
J. C. Shriver, '92.
J. S. Shultz, '00.
E. P. Shuman, '97.
*S. B. Sickler, '82.
J. S. Siebert, '86.
R. S. Siegel, '95.
E. H. Sigison, '95.
J. A. Simons, '02.
M. W. Singer, '06.
F. P. Sinn, '04.
G. A. Sisson, '05.
R. N. Skillman, '03.
J. B. Slack, '95.
J. E. Slade, '97.
W. P. Slifer, '02.
W. S. Slifer, '04.
Alfred P. Smith, '05.
Augustus P. Smith, '84.
D. Smith, '03.
D. R. Smith, '03.
*E. O. Smith, '85.
F. B. Smith, '97.
F. S. Smith, '87.
J. A. Smith, '06.
M. L. Smith, '07.
M. L. H. Smith, '07.
N. G. Smith, '06.
N. W. Smith, '93.
P. H. Smith, '02.
P. H. W. Smith, '92.
R. E. Smith, '94.
R. H. Smith, '05.
S. G. Smith, '07.
T. K. Smith, '03.
W. C. Smith, '06.
W. S. Smith, '00.
B. R. Smoot, '98.
J. G. Smull, '06.
A. M. Smyth, '89.
C. S. Snyder, '00.
E. E. Snyder, '87.
F. B. Snyder, '05.
*J. C. Snyder, '04.
N. H. Snyder, '05.
M. D. Sohon, '90.
E. A. Soleliac, '93.
A. Solorzano, '00.
F. P. Spalding, '80.
M. E. Spear, '06.
W. H. Speirs, '99.
J. H. Spengler, '86.
P. G. Spilsbury, '05.
A. V. Spinosa, '03.
H. W. Sprague, '97.
M. T. Stack, '97.
E. S. Stackhouse, '86.
L. C. Starkey, '98.
W. P. Starkey, '00.
C. W. Startsman, '01.
H. S. Stauffer, '01.
*J. W. Stauffer, '98.
H. T. Stearns, '05.
A. P. Steckel, '99.
H. E. Steele, '07.
E. G. Steinmetz, '95.
G. Stern, '93.
A. R. Sterner, '97.
E. S. Stevens, '02.
T. Stevens, '86.
*W. Alonzo Stevenson, '88.
W. Alston Stevenson, '90.
J. Stewart, '97.
M. Stewart, '84.
L. B. Stillwell, '07.
H. T. Stilson, '91.
W. R. Stinemetz, '93.
M. H. Stinson, '83.
*R. Stinson, '83.

H. R. Stocker, '06.
J. E. Stocker, '95.
A. W. Stockett, '89.
M. S. Stockett, '98.
L. Stockton, '81.
H. H. Stoek, '87.
W. H. Stokes, '88.
C. S. Stouffer, '06.
H. E. Stout, '86.
R. P. Stout, '91.
*H. R. Stratford, '94.
P. B. Straub, '97.
R. M. Straub, '99.
T. A. Straub, '90.
*J. A. Strauss, '00.
G. L. Street, jr., '06.
G. R. Stull, '03.
L. N. Sullivan, '05.
*J. K. Surls, '86.
W. C. Swartz, '94.
B. M. Swope, '07.
F. G. Sykes, '94.
E. H. Symington, '98.
J. F. Symington, '01.
T. H. Symington, '93.

T

R. L. Talley, '04.
J. E. Talmage, '91.
R. M. Tarleton, '95.
E. R. Tattershall, '06.
C. L. Taylor, '76.
E. S. Taylor, '96.
J. Taylor, '93.
L. C. Taylor, '89.
R. F. Taylor, '02.
R. S. Taylor, '95.
W. B. Taylor, '96.
W. P. Taylor, '86.
*O. O. Terrell, '87.
H. R. Thayer, '06.
L. Thomas, '07.
*T. C. Thomas, '97.
W. A. Thomas, '07.
W. E. Thomas, '02.
J. M. Thome, '70.
C. H. Thompson, '94.
R. R. Thompson, '05.
F. duP. Thomson, '90.
J. A. Thomson, '96.
E. T. Thornton, '01.
R. W. Thoroughgood, '02.
A. T. Thropp, '89.
R. R. Throp, '05.
N. Thurlow, '95.
E. C. Thurston, '96.
J. W. Thurston, '96.
S. H. Tilghman, '07.
H. A. Tobelmann, '00.
T. Todd, '06.
C. M. Tolman, '85.
C. C. Tompkinson, '90.
W. S. Topping, '91.
H. Toulmin, '86.
P. Toulmin, '86.
C. F. Townsend, '95.
J. B. Townsend, '95.
J. H. Traeger, '03.
C. E. Trafton, '96.
G. W. L. Travis, '07.
*L. B. Treharne, '80.
W. Treichler, '97.
E. R. Treverton, '07.
H. C. Tripp, '96.
P. H. Trout, '94.
L. E. Troutman, '93.
O. W. Trueworthy, '94.
H. R. Trumbower, '03.
R. H. Tucker, '79.
W. P. Tunstall, '03.
Charles P. Turner, '89.
Clarence P. Turner, '94.
Claude A. P. Turner, '90.

U

M. H. Ulman, '07.
W. F. Ulrich, '99.
G. G. Underhill, '01.
C. N. Underwood, '06.
C. W. Underwood, '94.
J. W. Underwood, '04.
W. E. Underwood, '97.
D. A. Usina, '91.
M. N. Usina, '92.
J. C. Utley, '07.

V

E. E. Valk, '06.
J. S. Van Alen, '01.
J. F. VanBenthem van den Bergh, '95.
A. H. Van Cleve, '90.
E. Vander Horst, '91.
H. R. Van Duyne, '97.
J. R. Van Duyne, '00.
P. R. Van Duyne, '06.
B. R. Van Kirk, '80.
E. P. Van Kirk, '87.
W. R. Van Liew, '95.
R. J. van Reenen, '06.
*C. H. Vansant, '95.
B. B. Van Sickle, '03.
C. H. Veeder, '86.
J. S. Viehe, '99.
J. R. Villalon y Sanchez, '90.
W. J. vonBorries, '05.
F. A. Vockrodt, '06.
J. D. von Maur, '94.
R. W. Vossberg, '07.

W

J. T. Waddill, '07.
*J. R. Wagner, '85.
C. P. Wagoner, '97.
R. Wahle, '04.
J. R. Wait, '06.
C. Walker, '89.
H. S. Walker, '05.
J. H. Walker, '05.
L. W. Walker, '92.
M. A. Walker, '03.
R. W. Walker, '84.
J. H. Wallace, '06.
J. S. Wallace, '96.
H. R. Walters, '03.
R. W. Walters, '07.
U. G. S. Walters, '96.
E. B. Walton, '07.
G. J. Walz, '05.
A. L. Ware, '05.
E. H. Waring, '98.
S. B. Waring, '04.
F. C. Warman, '93.
E. O. Warner, '94.
W. Warr, '95.
C. B. Warren, '98.
R. C. Warriner, '94.
S. D. Warriner, '90.
J. A. Watson, '84.
L. Watts, jr., '98.
*C. G. Weaver, '71.
H. S. Webb, '98.
W. M. Webb, '88.
C. E. Webster, jr., '98.
H. D. Webster, '96.
J. E. Weideman, '97.
F. A. Weihe, '89.
*F. T. Weiler, '96.
W. E. Weimer, '89.
E. C. Weinsheimer, '06.
W. H. Welker, '04.
J. H. Wells, '85.
G. W. Welsh, '01.
G. E. Wendle, '91.
A. J. Weston, '04.
F. C. Wettlaufer, '99.
H. M. Wetzel, '88.
A. Weymouth, '94.

F. I. Wheeler, '95.
I. B. Wheeler, '07.
C. B. White, '05.
G. C. White, '97.
H. A. White, '95.
W. P. White, '00.
C. Whitehead, '85.
D. H. Whitmer, '92.
J. C. Whitmoyer, '95.
E. S. Whitney, jr., '04.
A. J. Wiechardt, '87.
E. N. Wigfall, '95.
C. H. Wilcox, '07.
H. A. Wilcox, '99.
H. A. J. Wilkens, '87.
E. B. Wilkinson, '01.
W. C. Willard, '07.
D. S. Williams, '96.
D. T. Williams, '90.
E. H. Williams, jr., '75.
*F. Williams, '87.
A. J. Willis, '05.
*D. W. Wilson, jr., '96.
H. C. Wilson, '78.
H. D. Wilson, '01.
J. M. Wilson, '95.
J. R. Wilson, '96.
T. W. Wilson, '94.
W. L. Wilson, '88.
J. H. Wily, '05.
P. B. Winfree, '91.
E. B. Wiseman, '88.
N. J. Witmer, '87.
F. Wittman, '92.
*M. Wittmer, '82.
N. A. Wolcott, '03.
J. H. Wolfe, '05.
L. T. Wolle, '77.
C. O. Wood, '92.
G. H. Wood, '99.
H. L. Wood, '95.
T. B. Wood, '98.
H. R. Woodall, '89.
B. E. Woodcock, '92.
L. Wooden, '98.
W. B. Wooden, '94.
R. B. Woodring, '07.
*H. Woods, '87.
*F. C. Wooten, '80.
A. M. Worstall, '96.
W. Worthington, '98.
L. P. Wray, '06.
E. A. Wright, '89.
H. Wright, '90.
J. B. Wright, '89.
F. G. Wrightson, jr., '06.
R. F. Wunderly, '04.

Y

S. Yamaguchi, '88.
T. A. K. Yasharian, '00.
G. L. Yates, '97.
*R. B. Yates, '70.
E. A. Yellis, '00.
T. C. S. Yen, '01.
C. Yglesias, '95.
E. A. Yohn, '97.
S. A. Yorks, jr., '98.
C. E. Yost, '04.
*G. F. Yost, '87.
A. R. Young, '01.
*C. H. Young, '05.
F. S. Young, '97.
J. J. Young, jr., '06.

Z

E. R. Zalinski, '00.
C. F. Zimmele, '87.
*H. B. Zimmele, '98.
H. S. Zimmerman, '98.
*C. F. Zogbaum, '75.
L. R. Zollinger, '88.

INDEX.

PRESS OF
TIMES PUBLISHING COMPANY
BETHLEHEM, PA.